DEVELOPMENT OF A DECISION FRAMEWORK FOR KNOWLEDGE MANAGEMENT PROJECTS

THESIS

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Bill Bower

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Abstract

Currently there are many organizations within the Air Force who are developing and implementing Knowledge Management initiatives within their organization. Air Force resources are being committed to fund, implement, and support these initiatives without any overarching Air Force Knowledge Vision or Knowledge Strategy to guide these efforts. The purpose of this research is to provide a framework model and framework implementation process that can be used to guide the identification, selection, and eventual implementation of Air Force knowledge management projects.

An initial Literature Review was conducted and the findings were used to develop a framework model to guide the identification and selection of appropriate knowledge management initiatives that are consistent with organizational strategy and strategic objectives. Next, a Delphi study was conducted to evaluate the proposed framework and associated framework implementation methodology using four criteria: completeness, comprehensiveness, accuracy, and usefulness. The Delphi committee consisted of representatives from the Department of Defense, Army, Navy, Air Force, and National Defense University. The findings of the Delphi committee support the use of the proposed framework model as an appropriate method for guiding the identification and selection of knowledge management initiatives within the Air Force that are focused on supporting Air Force Organizational Strategy and Strategic Objectives. HQ USAF/SC, Principal Deputy Assistant Secretary for Business and IM, sponsored this research effort.

DEVELOPMENT OF A DECISION FRAMEWORK FOR KNOWLEDGE MANAGEMENT PROJECTS

I. INTRODUCTION

Knowledge has become the key economic resource and the dominant—
and perhaps even the only—source of comparative advantage."
Peter Drucker, from his book
"Managing in a Time of Great Change"

"Knowledge is the most democratic source of power."
Alvin Toffler

Introduction

The United States is in the midst of a revolution, a social and economic revolution. Along with the rest of the world's industrialized nations, the economic foundation of America is shifting from a manufacturing firm and production oriented society towards knowledge-based organizations and a knowledge-based society (Toffler, 1990; Drucker, 1993). Although we are in the midst of this transition now, it has not come about suddenly. Half a century ago, Nobel Award winning economist Fredrick Hayek recognized the importance of situational knowledge in the decision-making process the need to decentralize knowledge (Hayek, 1945) and in 1968 Peter Drucker was beginning to talk about the third wave and what the post-capitalist society would consist of (Drucker, 1968). Today this fundamental shift in our economic and social foundations, this third wave, is widely recognized throughout the academic and business community as the knowledge economy (Graham, 1999; Sveiby, 2000). Companies began to see that the key to success was not in creating a cheaper mousetrap, but instead to

create a better mousetrap or to come up with some concept that rendered mousetraps obsolete. "Rather than building advantages over their competitors, companies with high profitable growth aimed to make competition irrelevant by providing buyers with a quantum leap in value. We have come to call their way of strategic thinking *value innovation*" (Kim & Mauborgne, 1999). Value innovation is achieved by capitalizing on an organization's existing collective knowledge capital and by augmenting that knowledge capital through the creation of new knowledge capital. As the economies of many of the world's industrialized countries shift from a commodity-based industrial economy where a company's worth was expressed primarily in physical assets to a knowledge-based economy where people and knowledge are viewed as the company's most valuable assets (Davenport, 2000; Due, 1995; Teece, 1998) knowledge is becoming recognized as a new form of capital. It is becoming generally accepted within both the business and academic communities that knowledge is the key resource in our current economy and for companies to achieve a lasting competitive advantage, they will have to become knowledge driven, learning how to effectively capitalize on their stock of organizational knowledge (Drucker, 1993; Kim, Mauborgne; 1999; Mintz, 1999; Nonaka, 1991). The recognition of knowledge as the new form of capital in the new knowledge-based society (Davis, 1998; Kim & Mauborgne, 1999) requires a new look at how those projects designed to manage knowledge are planned, directed, controlled, and staffed (Due, 1995). Companies that have been successful in the new knowledge economy identified several key concepts or characteristics that each had in common, the most common of which were reliance on advances in information technology (IT) and increased utilization of the organization's knowledge resources. As knowledge becomes

accepted as a key resource for achieving competitive advantage, it stands to reason that there be increased emphasis in effectively managing an organization's critical knowledge resources. Knowledge management can provide companies with the ability to develop and execute their strategic decisions more effectively (Davis & Riggs, 1999; Prokesch, 1997). Both the commercial and government sectors see knowledge management as the way to not only increase their effectiveness in managing their existing stocks of organizational knowledge, but also as a way to create new knowledge and, in effect, increase the overall value of the organization.

Problem Statement

Both the Federal Government and the Department of Defense (DOD) have identified the need to have a knowledge management strategy to achieve strategic objectives within the Federal Government (Federal CIO Council Strategic Plan, 2000). The DOD has specifically identified the need for knowledge management to achieve the objectives outlined in Joint Vision 2010 and Joint Vision 2020 (DOD Information Management Strategic Plan, 1999). At this time, the DOD has not published an inter-service knowledge management vision and strategy that the individual services (Army, Navy/Marine Corps, Air Force) could use as a template for developing their individual service-level knowledge management visions and strategies. In the absence of any official DOD policy guidance, the individual services have proceeded to develop their own individual knowledge management visions and strategic plans. Currently, the Army and the Navy both have relatively young, but maturing, knowledge management strategies.

The Army has been practicing de-facto knowledge management since the mid-1980's, beginning with their joint operations and expanding knowledge management practices into the Regular Army in the 1990's. They have developed a very comprehensive vision and strategic plan for knowledge management and how it will help shape the current Army and the Army After Next (AAN), with the expressed intent of "institutionalizing" it within the Army organization (Army Knowledge Online Strategic Plan, 1998).

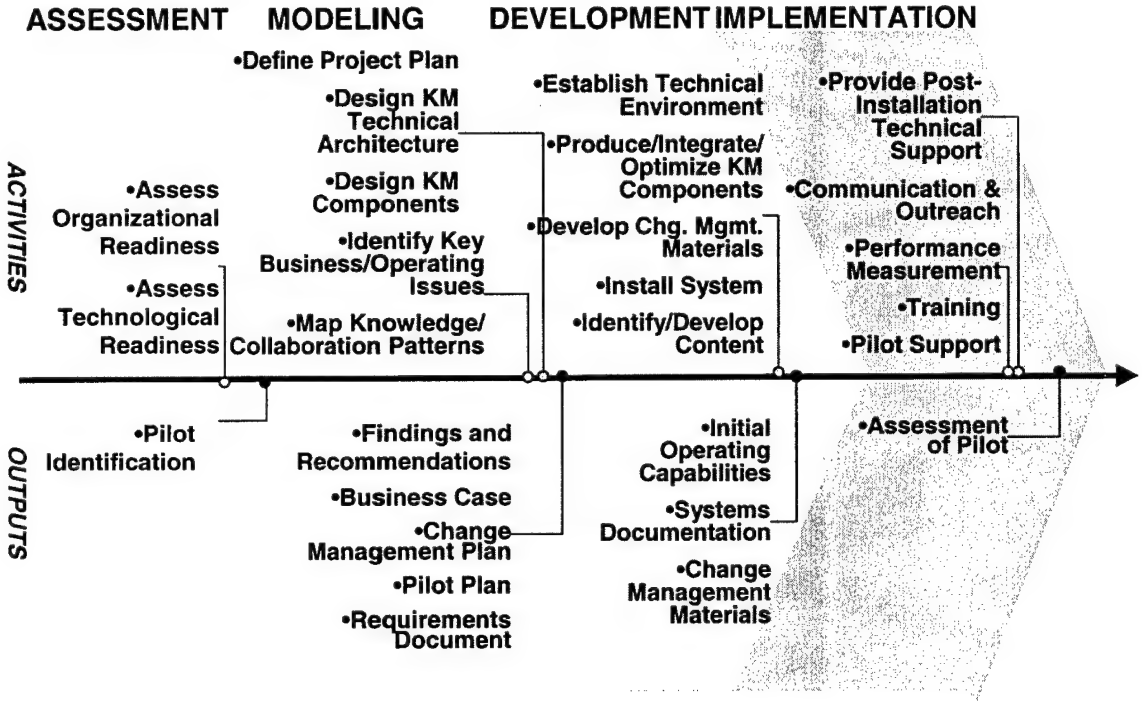


Fig 1.1 Army Knowledge Online (AKO) Framework
(AKO Strategic Plan, V 2.0)

The Army's enterprise-level knowledge management project, *Army Knowledge Online (AKO)*, began in late 1995 under the direction of then Army Chief-of-Staff General Dennis Reimer. Their AKO Strategic Plan provides a vision, strategy, and operational framework that Army project managers can use when selecting and implementing knowledge management projects to support the Army's knowledge management vision (Fig 1.1). Currently supporting over 65,000 users, AKO is projected

to support over 1 million users by 2005. The Army sees AKO as the linchpin in the Army's information superiority strategy, providing them with a "strategic e-mission" capability to support their role as the global, dominate land combat force (Browning & Wells, 2000).

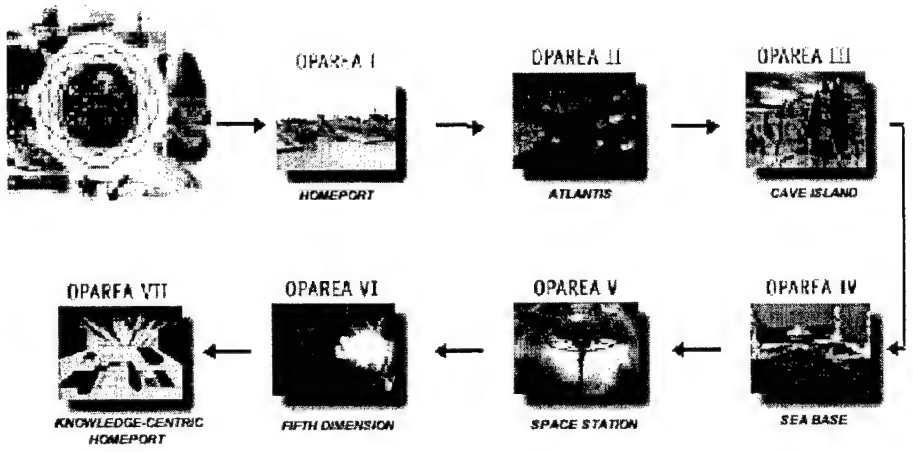
> Knowledge superiority for the Navy is key to what we do in war fighting.
>
> Alex Bennet
> Navy CKO and Deputy CIO

The Navy is also aggressively pursuing an enterprise-wide knowledge management strategy. While not as mature as the Army's, the Navy has also developed a Service-wide knowledge management vision and strategy. Like the Army, they provide a vision, strategy and underlying framework that Navy program managers can use when selecting and implementing knowledge management projects that would best support the Navy's overarching strategic objectives. Unlike the Army, which has developed a stand-alone strategic plan for implementing knowledge management, the Navy has incorporated their knowledge management strategy into their Department of the Navy Information Management/Information Technology Strategic Plan. The Navy has developed a broader, more conceptual framework to illustrate the Navy's vision of knowledge management

Fig 1-2 DON Knowledge Management Organizational Model
(DON DIO Master Presentation on KM, June 1999)

(Fig 1.2) and a seven-step process model to convert the Navy into a knowledge-centric organization (Fig 1.3) (DON IM/IT Strat Plan, 2001).

While the Army's knowledge management movement began as a grass-roots effort within the Joint Army community, the Navy's knowledge management efforts were initiated from the top down. The senior-level commitment that exists within the Navy across the entire organization has allowed it to capitalize on the experience of others and incorporate strategic planning into their knowledge management movement from its inception (Anthes, 2000). This initial and continued senior-level support has allowed the Navy to focus not only on the application of knowledge management (the



Knowledge Centric Organization

A Knowledge-Centric Organization is one that organizes virtually around its critical knowledge needs and then builds useful and relevant information to fill those needs. Knowledge-centric organizations merge the best of our time-tested command structures with knowledge based processes and technologies. To launch the DON forward into the next millennium, the Department is developing a tool to achieve a knowledge-centric enterprise.

Seven-Phase Process Model

Phase 1 (Create the Department of Navy Knowledge-Centric Organization) provides background and builds general awareness of what it means to be a KCO at the individual, command, and DON levels.

Phase 2 (Envision and Strategize) identifies an organization's core strategic process and assesses this process to identify actions that are critical to mission success.

Phase 3 (Develop Performance Measures and Incentives) provides performance measurement methods that enable the user to measure knowledge-centric organizational success.

Phase 4 (Design and Deploy) develops a taxonomy – a system of categorization that enables knowledge to be most easily managed, and provides the Knowledge Manager with different methods of knowledge creation and transfer.

Phase 5 (Operate and Sustain) covers the elements necessary to successfully sustain a Knowledge-Centric Organization.

Phase 6 (Measure Performance) deals with the implementation of a thorough performance review at a fixed time after

Fig. 1-3 Navy 7-Phase Process Model To Build Knowledge-Centric Organizations
(DON CIO Master Presentation on KM, June 1999)

practitioner side of the coin), but to also incorporate much of the theory underlying knowledge management. While the Army practiced knowledge management first and then incorporated it into their strategy later, the Navy has from the very beginning emphasized concepts like contextual thinking and case histories to strategically plan for their vision of a knowledge-centric Navy and implement their plan in a highly accelerated and balanced fashion (Anthes, 2000).

As a result, knowledge management in the Army tends to be more applications/practitioner focused, while knowledge management in the Navy balances that with more of the theoretical foundation of knowledge management. The Navy was the first service to adopt the use of a Chief Knowledge Officer (CKO), a role currently filled by the Navy Deputy CIO, Ms. Alex Bennet, and has been very astute in how it plans to integrate knowledge management into the Navy's existing organizational culture. Like the Army, the Navy plans to institutionalize knowledge management, seeking a synergy between the computational and cognitive reasoning capabilities that reside within the Navy; in essence, to seek a balance of synergy between people, information, and technology (Deller, 2000) that will evolve into a knowledge-centric organization. The Navy's enterprise-level knowledge management project is known as *Knowledge HomePort*. Currently implemented within the Pacific Fleet, *Knowledge Homeport* has not yet been released throughout the Navy; however, like the Army's AKO, the Navy sees *Knowledge HomePort* as the strategic driver for implementing knowledge management throughout the DON.

A review of existing Air Force strategic plans reveals that there is no enterprise-level Air Force organizational vision and strategy specifically developed for utilizing and

exploiting the Air Force's organizational knowledge (AF ITM Strategic Plan, 1997; AF CIO Strategic Plan, 2000; TC 99-06, 2000). Discussions with the Air Force's lead knowledge management representative, Mr. Bao Nguyen, Technical Director, Air Force Communications & Information Directorate of Architecture & Interoperability (AF/SCT), revealed that the Air Force is in the process of developing a knowledge management implementation framework, but this framework will not be available before this research effort is completed.

Programs implemented within the DOD can (or should) be able to identify the role they play in achieving a specific strategic objective. Commitment of funds and resources are tied, either directly or indirectly, to a specific mission capability that has been identified as necessary to support an organizational strategic objective. The strategic planning process has been explicitly linked to the military funding cycle and has been integrated down through every organizational level within the Air Force. Even without specific guidance, decision makers and project managers usually can identify what mission they are to support and can then work with senior leadership to identify, select, and implement those programs and projects that (should) best support the overarching strategic objectives of the organization.

Existing project management frameworks are useful for implementing these types of conventional projects; however, knowledge management projects tend to be far from conventional. Just providing an agreed-upon definition of knowledge can be nearly impossible without a specific strategy to tie the knowledge to (Davis, 1998; Hansen, Nohira, Tierney, 1999). One definition used in conjunction with knowledge management projects is that knowledge is information to which value has been added in some fashion

(Davenport & Pruzak, 2000) and the value of knowledge can only be realized when it is applied to solving a business problem, which in turn is determined by its impact on an organization's business strategies (i.e. strategic objectives) (Lia & Chu, 2000). This strategy-oriented definition of knowledge still doesn't specifically define what knowledge is, it just identifies where to look for knowledge, how to recognize it, and how to differentiate knowledge from other forms of information.

Another factor to consider is that knowledge within an organization is inherently tied to the process in which the knowledge was developed and utilized and any attempt to effectively manage that knowledge must take into account the business processes involved in creating and utilizing that knowledge (Bater, 1999). These business processes dictate the inter-organizational and inter-enterprise elements of knowledge management and the relationships between these elements, elements that must be dynamic enough to fluctuate with changes in an organization's business processes, while still supporting the long-range strategic objectives of the organization (Davis, 1998). A knowledge management project's ability to influence an organization's business processes, and ultimately the behavior within the organization, necessitates the need for some form of guidance that will help ensure that any resulting behavioral changes (and corresponding change in business process) is in accordance with the company's overarching business vision, strategy, and strategic objectives. In light of the movement towards viewing knowledge as an organization's most important strategic resource, it is understandable why knowledge management experts believe that the development of a corporate enterprise strategy for knowledge management that sets an overall framework for implementing knowledge management within the organization should precede the

implementation of any knowledge management project (Davis, 1998; Grenier & Metes, 1998; Zack, 1999).

Knowledge management has received increased emphasis throughout the DOD and expenditures on knowledge management related activities have increased accordingly. In one recent estimate, researchers at Federal Sources Inc. predicted that, based on current expenditures, "federal spending on knowledge management products & services is expected to double annually between now and 2003, reaching $6.3 billion in that year" (Ferris, 1999) and the Air Force is expected to spend a substantial portion of that amount.

In the absence of a cohesive vision and strategy similar to what is provided to Army, Navy and Marine decision-makers and project managers, individual Air Force units are left to their own experience, knowledge and judgement to develop and implement their individual knowledge management initiatives with no specific senior-level Air Force strategic direction or guidance. Again, unlike it's sister services, there is no organizationally specific framework or guidance available to Air Force managers upon which to formulate business decisions concerning the development and utilization of knowledge management practices and projects within Air Force organizations and to ensure that implemented KM projects directly support the Air Force strategic goals.

A framework is important and useful because it serves as a guide for identifying, categorizing, and understanding the myriad ideas, issues, and interrelated components underlying and supporting a complex construct or phenomena, in this case a knowledge management project. A framework also can be used as a form of roadmap that can help guide the decision-making process for selecting projects that support an organization's

enterprise (corporate-wide) knowledge management initiatives. The framework presented will be a generic prescriptive framework: generic in that it may support the decision selection process for a wide variety of knowledge management related applications and prescriptive in that it provides a roadmap to follow when selecting a knowledge management project.

As resources become increasingly constrained, including fiscal resources and more importantly, our human resources, it is imperative that Air Force decision makers be able to allocate these resources as efficiently as possible and with the greatest rate of return (i.e. investing in knowledge management projects that most efficiently support Air Force strategic vision, strategy, and strategic objectives). This research effort seeks to provide AF managers with a framework for implementing KM projects within their organization that is consistent with KM policy currently being developed across the Department of Defense.

Research Questions

- What is an appropriate methodology for identifying and selecting knowledge management projects for implementation in a large, diverse, multi-functional organization?
- What are the key factors that can directly affect the successful implementation of knowledge management projects within that organization.
- Given the current organizational structure and management philosophy within the DOD and the current state of existing knowledge management philosophy and initiatives throughout the DOD, the Air Force and its sister services, what factors

should be considered when identifying, selecting knowledge management projects for implementation within the Air Force.

Scope

This research effort will focus on developing a knowledge management project selection framework and decision methodology that managers and planners can use during the initial identification and development of knowledge management initiatives and projects. The scope of this research effort will be limited to identifying and reviewing existing knowledge management theory and practice within the commercial sector and the DOD, with the intent of identifying the factors that can affect the successful implementation of knowledge management projects. The presented framework and associated decision process methodology will be focused on identifying those factors, along with the underlying theory, methodology, and practices, that are most conducive with existing Air Force management practices and that best fit the Air Force organizational structure.

Research Approach

The research methodology chosen for this research effort is the development of a framework for identifying, selecting, and initiating the implementation of knowledge management projects, based on a literature review combined with a Delphi study to assess the strengths and weaknesses of this model. A review of existing knowledge management literature will be conducted with the intent of identifying aspects of the existing informal knowledge management construct that would apply to the current Air

Force organizational culture and management philosophy. The resultant findings would create a common conceptual taxonomy and initial working construct for the Air Force organization, establishing a theoretical foundation for implementing knowledge management projects within Air Force organizations. The Delphi study will assess the initial framework, identifying proposed modifications to the initial framework and proposed methodology (the model) for implementing the framework and reinforcing those portions of the framework that should be retained as presented.

Advantage to the Air Force

This research effort will provide an initial framework, based on knowledge management theory, that Air Force organizations can use when they are in the planning stage for addressing knowledge management issues and developing and implementing knowledge management projects.

II. LITERATURE REVIEW

"In the end, the location of the new economy is not in the technology, be it the microchip or the global telecommunications network. It is in the human mind."

Alan Webber

Overview of Knowledge & Knowledge Management

Most discussions of knowledge management begin with an explanation of some basic terms: data, information, and knowledge. It is important to differentiate between these terms because they each provide a different contribution to the organization. Data can be viewed as unorganized components of information that, individually, cannot be interpreted within a specific context and consequently, do not have meaning (Davenport & Prusak, 2000; Snowden, 1998). Information, on the other hand, is data that is organized in some form to give it meaning (Bourdreau & Couillard, 1999). Peter Drucker once described information as "data endowed with meaning and relevance" which supports the notion that data, by itself, serves little purpose. The act of taking data, codifying it, and organizing it by placing it in some form of context to be interpreted and inform potential users, is what transforms data into information. The field of information management grew out of society's need to take large aggregate amounts of data and impose some meaning and relevance to the data. Knowledge, on the other hand, is more difficult to define because it defies a single definition; there is a multitude of definitions for knowledge, but none of them completely captures the essence of the term (Davis, 1998; Frank, 2000). Some of the definitions that were identified during this literature review were:

- Knowledge is actionable information that is possessed in the mind (Nonaka, 1994; Lai & Chu, 2000)
- Knowledge is the experience, concepts, values, or beliefs that increases an individual's capability to take effective action (Alavi & Leidner, 1999)
- Knowledge is...the understanding of why and how something works. (It) is the understanding that enables the intelligent user to predict (Clark, 1998)
- Knowledge can be defined as the end result of understanding existing information or discovering new information (Watson, 1999)
- Knowledge is the actionable information embodied in the set of work practices, theories-in-action, skills, equipment, and heuristics of the firm's employees (Demarest, 1997)
- The Army's definition of knowledge is simply "information in a context that makes it actionable" (AKO Strategic Plan, 1999).
- Knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices, and norms. (Davenport & Prusak, 2000)
- Knowledge is information to which value is added in some form (Davenport, 2000)

From the variety of definitions above, one can see that it is virtually impossible to come up with a single definition of knowledge. On closer examination; however, we can identify some consistent themes that can be used to conceptualize knowledge:

- knowledge is part of a process that evolves from the application of information
- people are an intrinsic component of the knowledge process
- for something to be considered knowledge, it must exist in a form that can be utilized or acted upon

> "The worth of any piece of knowledge is a function of context, applicability, and usefulness"
> (Bourdreau & Couillard, 1999:26)

While these themes describe knowledge, they still don't explicitly define it. Knowledge is a broad concept that is made up of a variety of components and one of those components is the context or method in which it is intended to be used. Knowledge is often described in relation to the context in which it is used and when you ask business managers today to describe knowledge, they are very likely to preface their remarks with "it depends". For instance, knowledge and art are two concepts whose definitions seem to be self-evident. We intuitively know what knowledge is just like we know what art is. However, when we try to quantify these concepts, specific definitions become much more elusive. Intrinsic to both definitions is the concept of value, and use is one factor that is considered during any valuation process. Art with no value is considered junk, while junk that someone sees as valuable can be considered art. If a potential investor plans to use the art object as an investment, then the fact that it has little or no value would limit the use of the art object (it would have low utility). On the other hand, art that

has a history of appreciation would be seen by an investor as more useful for an investment vehicle (it would have greater utility). Knowledge can be viewed in the same fashion; in a business context, information that has value is considered knowledge while knowledge that has no value to the user or loses its value is no longer considered knowledge; it reverts back to information or possibly even data (Watson, 1999). The key to both examples is the concept of assigning value; within a business context, the valuation process is an integral part of defining what we consider to be art or knowledge. The assignment of value is a key element in the differentiation between art and junk and between knowledge and information. Like art, knowledge has value based on a specific valuation process conducted by the person who is acquiring or utilizing that knowledge. Value (or worth) is situationally and contextually dependent on factors assigned by the individual (or organization) that is attempting to acquire/utilize that knowledge. For a firm or organization, the needs of the organization would effectively define what it considered knowledge. The key point here is that the potential users of the knowledge in question (a corporation, organization, individual, etc.) are the ones responsible for ultimately assigning value; after all, "One man's knowledge is another man's data" (Stewart, 1997). Another important aspect of the valuation process is that knowledge (or art) does not have to have a specific monetary value to be considered valuable. Some factors that affect the art valuation process are availability of similar works, status of the artist, does the object give you pleasure, what was the previous value of the art object, and what is the potential future value of the object. Some factors that can affect the knowledge valuation process are its value as a strategic resource (Zack, 1999), its potential for creating value for the organization (Sveiby, 2000) and its applicability to the

organization's strategic objectives and core business practices to achieve a strategic advantage (Kim & Mauborgne, 1999). Those who view knowledge as a business enabler and a key link in the value chain (Sveiby, 2000) feel that knowledge should be evaluated by the decisions or actions to which it leads and that the value of knowledge can only be realized when it is applied to solving a business problem (Davenport & Prusak, 2000). LtCmdr Judith Godwin, knowledge manager for the Navy's Pacific Fleet, provides a perspective that is perhaps closer to home; "Only when information is put to use to benefit the organization does it become knowledge (Anthes, 2000). As you can see, these factors are contextually and situationally dependent on the particular organization and are dynamic in nature, which properly implies that knowledge is part of and results from a dynamic process. Those who view knowledge as the bridge between information and action feel that knowledge results from the cognitive analysis and comprehension of both explicit and tacit forms of information (Watson, 1999). By definition, this cognitive analysis is performed by individuals within the organization who conduct the valuation process and should be influenced by the organization's strategy and business processes when they place a value on knowledge.

"Who knows useful things, not many things, is wise"

Aeschylus

The focus of this thesis is on the development of a framework/methodology that decision-makers/program managers can use to guide the identification and selection of knowledge management projects. We will be approaching knowledge management from the organizational perspective and will be paying particular attention to the strategic

implications associated with knowledge management. With these perspectives in mind, we must be cognizant of the fact that organizations see knowledge as a strategic resource, one that has value (either current or future value) to the organization. Therefore, in the context of this thesis, we will view knowledge from an organizational perspective and strategic perspective consistent with Davenport's simple definition; "Knowledge is information to which value has been added in some form."

Why have we spent so much time defining what knowledge is? Knowledge has existed throughout history, so why is so much emphasis being placed on knowledge today? The answer can be found not in the worth of the knowledge itself, but in its potential for creating value. As we transition to a knowledge economy, the worth of knowledge has been elevated to the point where it is considered to be a firm's most valuable strategic resource (Due, 1995; Kim & Mauborgne, 1999; Zack, 1999). The ability to identify and utilize the knowledge that resides within in the organization is a critical component of acquiring a competitive and strategic advantage over adversaries (Berry, 2000; Cross & Baird, 2000; Hiser, 1998). The key is how to best apply an organization's knowledge to achieve that strategic advantage. Knowledge Management is an emerging discipline that has been tasked specifically to achieve that objective (Brown & Duguid, 1998; Hansen et al.,1999; KPMG "The Knowledge Journey, 1999). But what is knowledge management?

Below are some definitions of knowledge management that were identified during this literature review:

- The explicit and systematic management of vital knowledge and its associated processes of creating, gathering, organizing, diffusion, use, and exploitation (Skyrme, 1997)
- (It) is managing the corporation's knowledge through the processes of creating, sustaining, applying, sharing, and renewing knowledge to enhance organizational performance and create value (Allee, 1997; Davenport, et al., 1998)
- (It) involves the acquisition, explication, and communication of mission-specific professional expertise in a manner that is focused and relevant to an organizational participant who receives the communication (King, 1999)
- Identifying, capturing, and making knowledge easily accessible at the point of need (Davis, 1998)
- (It) is about making the collective information and experience of an enterprise available to the individual, who is responsible for using it wisely and for replenishing the stock (AKO Strategic Plan, 1998)
- (It) is viewed as a process for optimizing the effective application of intellectual capital to achieve organizational objectives (Bennet, 2000)
- (It) embodies organizational processes that seek synergistic combination of data and information-processing capacity information technologies, and the creative and innovative capacity of human beings (Malhotra, 1998)
- Knowledge management is the systematic underpinning, observation, instrumentation, and optimization of the firm's knowledge economies (Demarest,1997)

Given the difficulty of defining knowledge, one can see that there would likely be a diversity of definitions for knowledge management as well. Jerry Kantner gave what was perhaps the simplest definition to understand; " Knowledge management can be viewed as turning data (raw goods) into information (finished goods) and from there into knowledge (actionable finished goods)" (Kantner, 1999).

The concept of management implies the application of something, some resource, for a specific purpose. When looked at from an organizational perspective, management can be viewed as the efficient application of organizational resources to achieve the organization's strategic objectives. Personnel management, logistics management, operations management, financial management; they all involve the application of some portion of a firm's resources to achieve its stated (and sometimes unstated) strategic objectives. We look at knowledge as information to which value has been applied in some form; therefore, knowledge management can be seen as a way to apply that knowledge to achieve the desired strategic objectives of the organization (Kantner, 1999; Skyrme & Amidon, 1998) . In effect, knowledge management is a way to enhance a company's ability to execute their core business processes in a manner that gives it a competitive advantage (Davis, 1998).

There are currently two general trains of thought regarding knowledge management: the academic perspective is generally centered around a model of the firm as a knowledge system, while the commercial perspective primarily views knowledge management as a way of adding value to the firm by addressing existing and future business problems more effectively than existing business management methods allow (Demarest, 1995; Krogh, 1998). Both perspectives see knowledge management as a holistic process that

supersedes existing organizational and functional boundaries that exist within the organization (Bater, 1999; Nonoka, 1994), but academia is primarily concerned with understanding the laws and processes underlying knowledge management while the commercial interests are primarily concerned with achieving some form of control over the knowledge creation and application processes so that they may more effectively guide their application to achieve the objectives of the organization. Organizations are increasingly looking for ways to achieve this control and knowledge management projects are becoming increasingly familiar in any organization that seeks to achieve some form of competitive advantage over its adversaries, be they commercial adversaries or potential enemies.

It is estimated that up to 80% of the Global 1000 have knowledge management projects; one report indicated approximately 68% of the Fortune 1000 have defined knowledge management projects underway (Prusak, 1999). In a 1999 survey of 200 IT managers, InformationWeek Research found that 94% of companies felt that knowledge management was of strategic importance to their business or IT processes (Davis & Riggs, 1999). In 2000, KPMG published Knowledge Management Research Report 2000 (their second report, the first was published in 1998) where they surveyed 423 organizations across the US, UK, and Europe, all of which had annual revenues exceeding $347 million (KPMG Knowledge Management Research Report,2000). Of these, 81% said they had, or were considering a knowledge management (KM) program. Their primary motivations for pursuing KM were:

- Improving competitive advantage (79%)
- Marketing (75%)

- Product innovation (64%)
- Revenue growth & profit growth (63%)

Of those companies that had already implemented KM programs, the following expectations were realized:

- Better decision making (71%)
- Faster response to key business issues (68%)
- Improved productivity (60%)
- Create additional business opportunities (54%)
- Increased profits (52%)
- Increased market share (50%)
- Improve new product development (42%)

Given the results of these surveys, it can be deduced that KM can provide a company with the ability to achieve a competitive advantage (Zack, 1999).

Business journals, industry periodicals, and trade publications are replete with examples of organizations that are successfully using KM to achieve a competitive advantage in their market. This advantage is not theoretical or abstract, but instead can be measured in increased profits, increased growth, earnings derived from knowledge assets, stock value, etc. (Mintz, 1999). For instance, Platinum Technologies, a software firm recently acquired by Computer Associates for $3.5 billion, initiated a KM program in the wake of a series of company acquisitions to give its global sales force of 1,500 better access to sales information. Last year Platinum saw a $6 million ROI from an initial investment of $750,000. Also, Platinum has been able to achieve a consistent increase its revenue productivity by an estimated 4% per year (Davis & Riggs, 1999). British

Petroleum (BP) has instituted a KM program that saved them over $1.1 billion in capital expenditures by reducing average drilling time for deepwater wells from 100 days to 42 days (Prokesch, 1997).

The purpose for this brief discourse on the state of knowledge management projects in the business sector is to emphasis the scope of knowledge management in the commercial world today. There has been a great deal of information written about knowledge management that's been focused primarily on the application of knowledge management in the business sector. Much of this literature is focused on identifying the pitfalls and success factors underlying the implementation of knowledge management initiatives.

Mirroring this interest, the Department of Defense (DOD) has also become increasingly interested in the concept of knowledge management as a way of achieving a strategic advantage over our adversaries and as a way to create efficiencies of scope and scale within the DOD by capitalizing on our existing organizational knowledge. A secondary, and more long-term objective (as identified in the DOD and individual service Strategic Plans) is to transition the individual services into learning organizations using knowledge management as the agent for change management. Consistent with existing trends in the commercial sector, we in the DOD are also being asked to do more with less, do it more efficiently and faster, and be more flexible and responsive to increasingly dynamic social, economic, and cultural diversities both within the United States and throughout the world. To achieve these objectives and at the same time, compete effectively with the commercial sector for some of the same knowledge resources (i.e. people), the DOD is increasing their reliance on projects that focus on some aspect of

knowledge management. Federal spending on knowledge management projects is expected to reach $6.5 billion by 2003 (Ferris, 1999) and the DOD is expected to field the lions share of those projects. As stated in Chapter 1 of this thesis, the Air Force is not as far along as the other services in providing our decision makers and program managers with guidance on how to identify potential knowledge management opportunities and select and implement appropriate knowledge management projects within the Air Force.

This literature review was used to identify key aspects of the literature currently available in the commercial sector and within the federal government and the DOD that were applicable to the identification of potential knowledge management opportunities within the Air Force and the factors involved with selecting and implementing knowledge management projects to capitalize on those opportunities. Those key aspects were synthesized into an initial working framework that Air Force decision makers and program managers can use for identifying knowledge management opportunities and for selecting and implementing the appropriate knowledge management projects within the Air Force's existing organizational structure.

To summarize, a description of knowledge and knowledge management was presented from an organizational/business perspective. Emphasis was placed on the utilization of knowledge from a strategic perspective and on how knowledge, as a part of the organization's value chain, can add value to the organization. The current state of knowledge management in the commercial sector was briefly discussed and linked to the increased utilization of knowledge management projects to implement organizational knowledge management initiatives. Chapter 1detailed the current state of knowledge management within the DOD, the Air Force and her sister services and emphasized the

need to have some form of methodology in place to assist decision makers and program managers regarding the identification, selection, and implementation of knowledge management projects. The remainder of this literature review will be used to link the components of the proposed framework back to the existing literature and provide an explanation of how the key aspects identified during the literature review were synthesized into a initial working model/framework and associated decision flow diagram.

> A decision framework is essential for the selection of an enterprise information system. Learning to follow (a) framework provides assistance to organizations in identifying common challenges encountered by project teams when selecting and implementing enterprise information systems. By choosing the right team and partners and by choosing the right system and data design, companies can substantially increase the performance of their enterprise system.
>
> ***(Lee, 1998)***

Framework Development

Although knowledge management is a holistic process that crosses functional, organizational, and process boundaries and at times crosses or synthesizes theory from several disciplines, the framework was constructed and presented in a hierarchical, lock-step format. This author's experience in project management, IS project management, education and learning, and the limited exposure that was likely to have occurred to the majority of Air Force decision makers and program managers regarding knowledge management were factors that helped guide the selection of an appropriate process format for the framework. It was determined that a structured process would be easier to utilize and provide a context that was more familiar to potential users (who were likely to be unfamiliar with the concept of knowledge management) than would a broad, macro-based

view of knowledge management that did not provide specific direction and guidance. The lock-step format provides a clearly defined series of tasks that merge into an overall consistent process and an ordered methodology. An advantage of using the lock-step format for this framework is that within the framework, there are certain steps and decisions that should occur in a sequential manner and the lock-step format will support this requirement. This format will be incorporated into the proposed framework to be applied to the knowledge management project management selection process. The framework is illustrated as part of a graphical model (Appendix A) that provides a methodology for applying the framework to the knowledge management project selection process. Decisions made throughout the selection process are creating the groundwork for the project implementation team, establishing implementation parameters that will determine how the project is implemented and, to a large degree, determine the future success of the project.

The initial framework is structured to provide guidance in the identification, selection, and application of knowledge management projects. Its greatest usefulness is expected to lie in the area of knowledge management applications designed to support organizational strategic objectives. The proposed framework and associated decision flow diagram utilize a methodology that is familiar to most decision-makers and program managers, yet still incorporates key aspects of knowledge management that this author feels should be taken into account when identifying, selecting, and implementing knowledge management projects. This framework is not meant to be all-inclusive, nor it meant to be taken as an absolute. The value in this framework is that, like all frameworks, it provides a roadmap that provides the user with a starting point, a direction and

milestones that can be used as a general guide through the knowledge management project selection process (Lee, 1998). Deviations from this basic framework are expected based on user and mission requirements, as well as the situational and contextual circumstances present within the organizational environment the knowledge management project or initiative is being implemented. The applicability of each step (or phase) of the framework and the level of detail to which the framework is applied to each project selection process will differ depending on the scope and expected outcomes of the project. Knowledge management projects that are initiated as organizational change initiative (create knowledge-based organization or recreate organizational culture) will find certain aspects of the framework (decision variables) more applicable than projects focused on establishing organizational knowledge repositories.

6-STEP KM PROJECT SELECTION DECISION PROCESS FRAMEWORK	
1.	Analyze Corporate Strategic Objectives Using SWOT (Strengths, Weaknesses, Opportunities, Threats) Methodology
2.	Identify & Analyze Potential Knowledge Management Opportunities
3.	**Identify & Address Potential Knowledge Management Projects**
4.	**Identify & Address Knowledge Management Project Variables Affecting Project Implementation & Success**
5.	**Identify & Address Success Factors For Project Variables Affecting the Successful Implementation of Knowledge Management Projects**
6.	Finalize Knowledge Management Project Selection

Table 2.1 6-Step KM Project Selection Decision Process Framework

The framework consists of a 6-step process that begins with an analysis of the organization's overarching strategic vision, plan, and objectives using a standard Strengths, Weaknesses, Opportunities, and Threats (SWOT) methodology and concludes

with an identification of key considerations (factors) that must be resolved prior to project implementation to ensure success (Lee, 1998). The purpose of the SWOT methodology will be explained in more detail later in this chapter. The analysis from step 1 is used in step 2 to identify potential knowledge management opportunities and limitations as they relate to the organization's strategic goals and objectives. The output of step 2 is used in step 3 to identify potential knowledge management projects that can be implemented within the organization. Steps 4 & 5 are closely related and can be done concurrently. Step 4 identifies key project variables associated with the potential knowledge management projects identified in step 3. Step 5 uses the key project variables identified in step 4 to identify specific factors associated with each project variable that can affect the success of the knowledge management project when it is implemented within the organization. Step 6 is simply the process of finalizing the knowledge management project selection and proceeding with the implementation.

To minimize confusion and keep the model focused on the knowledge management project selection process, the actual implementation process is not included as part of the model. A model was developed based on a standard decision-flow-diagram (used standard audit flowchart template found in Visio 5.0) and the framework was incorporated into the model. The model graphically illustrates the underlying construct for the framework and provides a taxonomy and associated methodology for understanding and applying the framework to the knowledge management project selection process.

To maintain a consistency between the theory and the framework, concepts will be covered when they are first introduced in the framework process flow, although the

holistic aspect of knowledge management could, in practice, result in several processes occurring concurrently or possibly, even before they are introduced in the framework. It is important to remember that, although the framework is laid out in a hierarchical format, the processes described by the framework remain flexible so as to adapt to the dynamic nature of knowledge management and project management in general.

STEP/PHASE 1 – Analyze Corporate Strategic Objectives Using SWOT Methodology

Key Factors Affecting Decision Process

- Corporate Strategic Objectives
- Knowledge Required to Achieve Strategic Objectives
- Corporate Knowledge Vision & Strategy
- Future Knowledge Requirements
- Current Organizational Knowledge
  - Captured or Known
  - Uncaptured or Unknown
- Current & Future Information Requirements
- Opportunities to Capitalize on Organizational Knowledge

Key Decision

Can Knowledge Management Provide A Strategic Advantage to the Organization?

Linking Knowledge Management to the Organization's Strategic Objectives and Business Processes

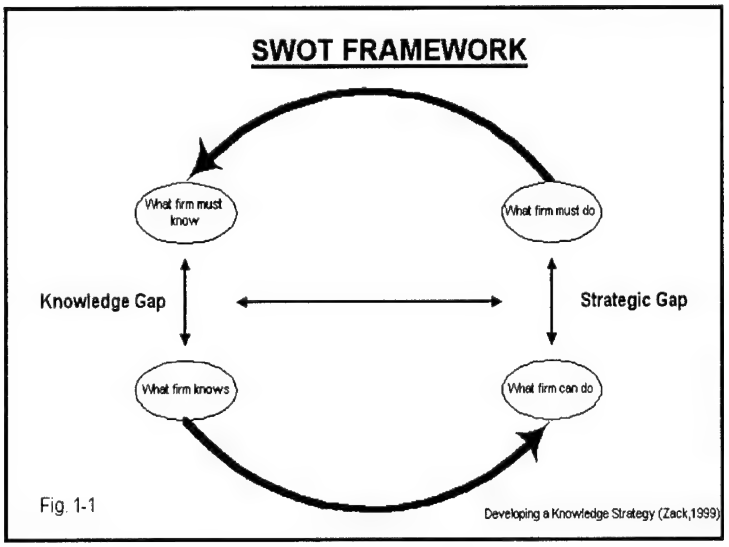
> "One of the key management issues associated with knowledge management is that a commitment to an effective knowledge management capability is indeed a strategic commitment."
>
> (Davis, 1998)

There is almost universal agreement among knowledge management experts that an organization's enterprise strategy should establish the overall framework for its knowledge management vision and strategy and any subsequent knowledge management initiatives enacted within the organization (Davis, 1998; Davenport et al., 1998, Harvard Mgmt. Update, 2000; Andriessen et al., 1999). Linking knowledge management to the organization's core business practices is considered to be a key factor to the eventual success of any knowledge management effort and the organization's strategic objectives should clearly reflect the organization's core business processes to provide the milestones against which to measure knowledge management success (Bourdreau et al., 1999; Hansen et al., 1999; Hiser, 1998; KPMG: The knowledge journey, 1999). In other words, the organization's strategic vision and strategy should be conducive with the organization's core business processes. The organization's strategic objectives are derived from that enterprise-level strategic vision and strategy and drive the development of any subsequent business strategies developed by the organization. One such business strategy is a knowledge management strategy. Before any knowledge management efforts are undertaken, an enterprise knowledge strategy and vision should be developed to ensure future knowledge management efforts support the organization's overall strategic business objectives. This step is seen as one of the key success factors when integrating knowledge management into the organization (Davenport & Prusak, 2000; Skyrme & Amidon, 1998, Zack, 1999). The development of a knowledge management strategy that is tied to the organization's overall strategy and strategic goals will ensure that the organization is making the best investment of its resources. This link to the organization's

core business processes will focus the organization's knowledge management efforts, ensuring that it is managing the right knowledge in the right way.

> "The most important context for guiding knowledge management is the firm's strategy"
>
> (Zack, 1999)

While this link between the organization's business strategy and knowledge management has been recognized as critical to the success any knowledge management implementation efforts, in practice it has been widely ignored because many senior executives responsible for the organization's strategy formulation do not understand the potential benefits of knowledge management and the implications that could arise from pursuing the wrong knowledge management strategy or no strategy at all (Fahey & Prusak, 1998; KPMG: The knowledge journey, 1999; Zack, 1999). One way to establish this strategy-knowledge link is to use the strengths, weaknesses, opportunities, and threats (SWOT) framework (Fig 2.1). SWOT is regarded as the most well known approach to defining corporate strategy and has been in use, both in practice and in research, for over 30 years (Andrews, 1971).



A SWOT analysis will help identify the organization's knowledge gap and strategic gap. The Strategic gap is the difference between what the firm is currently doing and what it must do to be competitive. The strengths and weaknesses analysis of the

SWOT framework identifies the firm's capabilities and the opportunities and threats analysis identify what the firm must do to be competitive. Underlying this strategic gap is a potential knowledge gap; this is the knowledge that is required by the firm to achieve its strategic objectives and this is where the firm's current and future knowledge requirements are identified. Based on this analysis of their knowledge-based resources, the organization can determine the type(s) of knowledge that should be developed or acquired to close the strategic knowledge gap (Zack, 1999).

The advantage of using the SWOT framework and methodology is that the organization's knowledge requirements are directly derived from and aligned with the organization's strategic gap and therefore directly support the organization's strategic objectives. Also, current organizational knowledge is identified and generically defined to assist in the identification of opportunities to capitalize on existing organizational knowledge that supports the organization's current strategic advantage (performed in Step/Phase 2 of framework). This organizational knowledge is also referred to as intellectual capital (Fig. 2-2), to reflect the value this knowledge can add to the overall worth of the organization (Sveiby, 1998; Watkins, 1998).

The search for organizational knowledge should include any knowledge that has the potential to benefit the organization. This initial knowledge search should be focused at the strategic level and identifying those types of knowledge that comprise an organization's intellectual capital. This initial audit is not a formalized attempt to map the organization's knowledge; that in itself is a very extensive knowledge initiative and should not occur until the organization has defined its strategic knowledge vision and objectives. An organization's intellectual capital typically falls into three categories:

human, structural/organizational, and social/customer (Bennet, 2000; Kanter, 1999). The focus on social vs. customer knowledge is normally dependent on the focus of the organization's business processes, but they both reflect the human-based process knowledge residing within the organization (interactions, relationships, formal and informal networks, etc.) that provides the linkage between tacit and explicit knowledge.

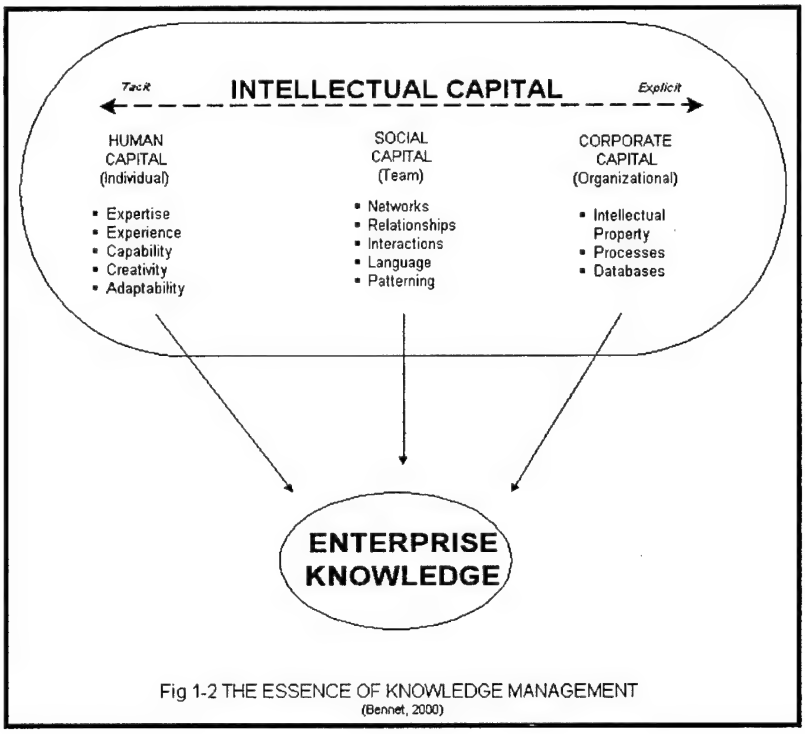


Fig 1-2 THE ESSENCE OF KNOWLEDGE MANAGEMENT
(Bennet, 2000)

STEP/PHASE 2 – Identify & Analyze Potential Knowledge Management Opportunities

Key Factors Affecting Decision Process

- Senior leadership interest & project sponsorship
  - Need senior mgmt/leadership involvement as knowledge management champion(s)
  - Will organizational leadership be active proponents of change and have they made a long-term strategic commitment to knowledge management
- Identify and analyze current business processes for potential knowledge management opportunities

- Identify potential opportunities to apply knowledge management to existing business practices to achieve organizational strategic objectives while adding value to the organization

- Perform valuation process on current organizational knowledge (tacit & explicit) to determine current worth and potential to capitalize on existing knowledge to create more value for the organization (strategic advantage)
  - Base valuation on current business processes and corporate strategic objectives
- Availability & Usability of current organizational knowledge (tacit & explicit)
  - Should be part of initial valuation process
  - Identify opportunities for exploiting existing organizational knowledge to achieve strategic advantage and potential limitations if organizational knowledge is not readily available and usable in current state (i.e. tacit knowledge not identified or shared, explicit knowledge supporting core business processes not readily available to potential users.
- Evaluate potential loss of critical organizational knowledge
  - Personnel retire or switch employers
  - Processes not properly documented so explicit knowledge is not captured for future use
  - No methodology in place for maintaining currency of existing organizational knowledge (primarily explicit, but can be tacit as well)
- Will current organizational structure support and utilize knowledge management initiatives
  - Is there great reluctance to share data or use other peoples' data

- Will current organizational culture support the flow, transfer, and use of information across functional and organizational boundaries

- Is current organizational structure conducive to knowledge sharing
  - Will organizational boundaries limit or inhibit the flow and transfer of knowledge
- Analyze existing IT infrastructure
  - What level and type of knowledge management activities and initiatives will it support
  - Look at current state and future state based on IT strategic plan. Knowledge management initiatives are heavily reliant on IT for information gathering, storage, and transfer; infrastructure must support initial knowledge management initiatives and be robust/dynamic enough to meet future demand
- Identify potential opportunity to transform organization into a knowledge-based, learning organization
  - Organizational culture adjustment hardest obstacle to overcome
- Identify organizational resources available for knowledge management initiatives
  - Includes manpower, equipment (primarily IT), funding, a footprint (space), and funding
    - Will resources be dedicated for the duration of the knowledge management initiatives
  - ID current and future budget constraints
    - Will project be expected to achieve ROI before it is feasible

<u>Key Decision</u>

- Should the organization pursue knowledge management opportunities?

- Do the potential advantages of knowledge management outweigh the limitations identified in Step 2?
- Will knowledge management initiatives help achieve organizational strategic objectives and provide increased value to organization?
- If so, is there enough justification, given identified limitations, to proceed forward with pursuing knowledge management initiatives?

Theoretical Support for Step 2 Key Factors

As stated previously, knowledge management is by nature a holistic process which will result in an eventual cross-flow of effort amongst the various steps/phases of the framework such that processes in Step One could initiate action of processes in Step 2 before the decision is made to proceed from Step 1 (SWOT analysis) to Step 2 (ID & analyze potential KM opportunities & limitations). The valuation process of existing organizational knowledge, to include the availability and usability of that knowledge and the potential loss of that knowledge would factor into the SWOT analysis as components of the organization's strategic gap and knowledge gap that were identified during the initial knowledge audit. However, Step 2 is where an analysis of the SWOT findings are performed to identify areas where knowledge management can close the organization's knowledge gap and assist in achieving a strategic advantage for the organization (Davis, 1998; KPMG: The knowledge journey, 1999; Zack, 1999). The knowledge gap identified in Step 1 should now be quantified based on type of knowledge needed to achieve the organization's strategic objectives and the usability and availability of that information to be utilized to support potential knowledge management objectives. Conversely, any potential limitations should be analyzed to identify where knowledge management

practices could be applied to overcome these limitations. One example of a potential limitation is knowledge attrition; "according to some estimates, the average organization looses half its knowledge base every five to ten years through the turnover of employees, customers, and investors." (KPMG, The Knowledge Journey, 1999). Other examples of limitations would be a loss of process knowledge on a critical business process because it is not captured or the inability to efficiently share or access knowledge because of limitations of organization's IT infrastructure. It is at this point where support from senior management becomes critical and must be sustained throughout the knowledge management initiative selection and implementation process. Step 1 provides the analysis and support for looking at knowledge management as a way of achieving strategic advantage, and the outcome of Step 1 is what is normally used to convince senior leadership of the need to pursue knowledge management and to support future knowledge management initiatives.

> "The most important factor in creating knowledge value was to create an effective knowledge infrastructure—with knowledge leadership, developing knowledge roles & skills, and creating a culture of knowledge culture."
> (Skyrme & Amidon, 1998)

For knowledge management initiatives to achieve their full measure of value to the organization, they must become institutionalized within the organization. This means the potential realignment of the organizational structure may be required to better facilitate knowledge access, capture, sharing, and utilization. At the very least, knowledge management will require the organization to rethink the way it views its corporate assets and make the necessary adjustments within the organization to take full advantage of those assets. The eventual goal of the organization should be a

transformation of organizational culture into one that promotes and encourages continuous learning (Davenport & Prusak, 2000). This "learning culture" will promote the transformation of the organization into a learning organization that can not only effectively utilize its existing organizational knowledge, but can actually create new, additional organizational knowledge to contribute to the organization's store of knowledge and ultimately add value to the organization (Brown, 1998; Huang, 1998).

If the outcome of the SWOT analysis is not substantial enough to convince senior leadership of the need for knowledge management then it is highly unlikely that any future knowledge management initiatives will achieve long term success within the organization (Davenport et al., 1998). Active participation and involvement from senior leadership and a willingness to champion the advantages of knowledge management throughout the organization are seen as key success factors to the long-term success of any knowledge management effort (Andriessen, 1999; Bourdreau & Couillard, 1999; Davenport et al., 1998; Hiser, 1998; Skyrme & Amidon, 1998). Senior leadership involvement and support can become crucial for overcoming future roadblocks and shortfalls. Without the support of senior leadership to champion the knowledge management concept and promote the subsequent organizational changes that will arise from the successful implementation of knowledge management initiatives, the existing organizational culture, structure, and infrastructure can critically impair the ability of the knowledge management initiative(s) to achieve long-term success (Davenport & Prusak, 2000; Lucier & Torsilieri, 1997). Potential hurdles may be so great that the knowledge management efforts will never get off the ground.

Senior leadership is necessary for an accurate and comprehensive analysis of the organization's current business processes. An investment of time, effort, and money will be required from all the functional entities that contribute to the business processes being analyzed. Without the support from the top, it will be difficult to get functional managers to prioritize the knowledge management analysis efforts within their functional unit so that the resulting data is accurate and will contribute to the analysis effort. Any knowledge management initiative will require an extended commitment of resources from within the organization to succeed and typically those resources are mobilized or siphoned off from the organization's other business units (Harvard Mgmt. Update, 2000). Senior leadership support is necessary to champion this shifting of resources and to articulate the need for knowledge management and the future benefits it holds for the organization and its members.

As identified previously, the ultimate goal of any organization that accepts the need for knowledge management and commits the resources to implement knowledge management initiatives should have as one of their strategic goals the transformation of the organization into a learning organization. A focus on continuous learning throughout the organization establishes organizational priorities on the value of knowledge as a strategic resource and helps promote a culture of knowledge sharing and creating. Coupled with the appropriate technological infrastructure and established knowledge infrastructure, the organization is then able to make the necessary cultural transformation and conversion to a knowledge-based learning organization (Lucier & Torsilieri, 1997; Skyrme & Amidon, 1998).

> "Whatever the intellectual capital of a company may be, it's worthless if the managers of the company can't figure out how to do three things: assess it, deploy it, and profit from it."
>
> (Brown, 1998)

Essential components of this transformation process are the need for a robust, dynamic IT infrastructure to enable the knowledge creation, capture, sharing, and utilization practices and the need for a knowledge-focused organizational infrastructure to provide the support necessary for the aforementioned knowledge practices. Without these two components, the organization will be ill equipped to capitalize on its existing stores of organizational capital. A critical factor when identifying potential knowledge management opportunities is the analysis of the conduciveness of the organization's existing organizational structure and culture to promote the principles of knowledge management (Nissen, Magdi, & Sengupta, 2000; Simon, 1998).

An analysis of the current organizational structure and culture will help identify potential issues affecting the creation of a learning organization and will also identify potential hurdles to overcome for knowledge capture and knowledge sharing initiatives. The process-focused orientation of knowledge management will at times be in conflict with the function-focused orientation of many existing organizational structures and cultures. If the organization's culture and structure are not dynamic or flexible to adjust to a process-oriented business approach, then these would be seen as limitations that must be overcome before any knowledge management efforts can be initiated.

The organization's IT infrastructure must be looked at in the same fashion. IT and knowledge management have a dyadic relationship, knowledge management will not be as effective in today's modern organization without IT, and IT will not provide effective

support for a knowledge-based organization's knowledge-centric processes unless it subordinates itself to the human factors associated with the organization's knowledge-based processes. Knowledge management is a human-centric process and the role of IT in the knowledge management process is that of an enabler that supports knowledge management; but it should never be seen as a substitute for the human interaction that is intrinsic to the concept of knowledge and knowledge management (Andriessen, Leonore, & Kevenaar, 1999; Bourdreau & Couillard, 1999; Davenport & Prusak, 2000; Kanter, 1999).

Several other factors to consider when identifying potential knowledge management opportunities and limitations are the availability of resources that can be applied to these efforts, resource requirements and any potential budget constraints that could impact their long-term sustainability, development costs for applications to support knowledge management initiatives and payback period (Lee, 1999). As stated previously, many new enterprise efforts (like knowledge management) utilize existing resources to initially field the new effort with the promise to the functional unit lending the resources that they will be returned in the future. Knowledge management takes a strategic commitment from the very beginning and that means the resources have to be committed unconditionally and indefinitely to the knowledge management effort. There are two types of resources to be discussed here, resources to support the organization's enterprise-wide commitment to knowledge management and resources to support the various levels of knowledge management efforts that will be enacted throughout the organization in support of the organization's commitment to knowledge management. The knowledge management organizational structure and support system that's created to

support the organization's enterprise-wide commitment to knowledge management and enterprise-level knowledge management initiatives should be committed directly by the senior leadership without any strings attached to any functional entities within the organization. Functional knowledge management efforts that originate at a lower level within the organization and do not directly impact the entire enterprise (but still support the enterprise's overall knowledge management vision & strategy) need the same level of strategic commitment from their project champions.

Knowledge management requires a unique set of skills to implement and manage on a daily basis and knowledge management projects/efforts are somewhat different from other types of projects (Davenport et al., 1998; Lai & Chu, 2000; Skyrme & Amidon, 1998) and it's important to field the project/effort with the appropriate project management skills and ensure they will remain in place for the duration of the project. The project management personnel can transition to sustainment personnel after the knowledge management effort is up and running, but there must be a long-term commitment to the knowledge management effort and this commitment should be incorporated into the organization's long-range financial and human resources budgets. As any IT project manager can attest, planning for project sustainment is just as critical to the overall success of the project as is an initially successful implementation (Harvard Management Update, 2000).

STEP/PHASE 3 – Identify & Address Potential Knowledge Management Projects

Key Factors Affecting Decision Process

- Senior leadership interest & project sponsorship

- Need continued active participation and involvement from senior leadership
- Need knowledge management champion and project sponsor

- Tie potential knowledge management efforts to key business processes identified in Step 2
- Focus knowledge management efforts on people & processes, not the technology
  - IT is just an enabler, the knowledge users and producers are the people and processes within the organization
- Identify scope and desired outcome of potential knowledge management efforts/initiatives/projects
- Define the knowledge to be utilized by the knowledge management effort
  - Definition of knowledge should be tied directly to knowledge valuation process performed in Step 2
- Develop common taxonomy of terms (common language)
  - Everyone needs to be operating off of the same page and have the same understanding of knowledge management definitions, desired outcomes, goals, milestones, metrics, and expectations.

Key Decision

- Is there a knowledge management project(s) that will achieve the scope and desired outcomes of the knowledge management efforts identified in Step 3?

> "You can't really manage knowledge. What a company can do is manage the environment that optimizes knowledge."
>
> Laurence Prusak

Theoretical Support for Step 3 Key Factors

This step/phase of the framework is focused on identifying specific projects that can capitalize on the organization's potential knowledge management opportunities and address the existing & future potential limitations identified in Step 2. The primary focus should be to select knowledge management efforts that can close the organization's strategic gap and knowledge gaps identified in the Step 1 SWOT analysis. The six key factors referred to above are generic to all knowledge management efforts in that they identify critical factors that should be addressed, no matter what type of knowledge management effort is being researched and selected.

As stated in Step 2, the active involvement and sponsorship by senior management throughout the entire knowledge management project selection and implementation process is a factor that is critical to the overall success of the organization's knowledge management efforts. When identifying potential knowledge management efforts, a key point to keep in mind is that the project selected should be able to be tied directly back to a specific organizational strategic objective. The most effective way to accomplish this is to select a project that supports one of the organization's key business processes. An important assumption made in this thesis is that, prior to the initiation of Step 3 of this framework, the organization has aligned, or is in the process of aligning, its key business processes to its strategic vision and those business processes directly support the organization's strategic objectives to achieve its strategic vision. Step 1 explains the need for this to occur to ensure any knowledge management projects identified in Step 3 fall within the organization's enterprise strategy and knowledge management strategy framework identified in Step 1. The organization's core business processes will provide the milestones against which to measure the success of any knowledge management project selected.

The outcome of Step 2 should have identified numerous opportunities to deploy knowledge management within the organization. One management behavior that is directly associated with successful knowledge management projects is the role of senior leadership in identifying the initial strategic focus of the organization's knowledge management efforts to one or two strategic objectives and establishing the appropriate scope of the organization's knowledge management projects as they relate to those targeted strategic objectives (Lucier & Torsilieri, 1997). This exercise in senior

leadership will provide the appropriate guidance to project managers for identifying smaller knowledge management projects within their functional units that will support the organization's enterprise-level knowledge management initiatives and ensures the decentralized knowledge management efforts that will invariably occur in a large organization will have a central focus on a critical, high-value business problem (Ambrosia, 2000). Numerous articles focused on identifying critical success factors for knowledge management projects all agree that any knowledge management project initiated must have a clearly defined and measurable business purpose (Davenport et al. 1998; Davenport & Prusak, 2000; Harvard Mgmt Update, 2000; Kanter, 1999; Lucier & Torsilieri, 1997; Skyrme & Amidon, 1998).

After the scope and desired outcome of the organization's knowledge management efforts have been identified, then specific types of knowledge management projects can be identified. Part of this knowledge management project identification process should be to define the knowledge to be utilized by the knowledge management effort and to establish a common taxonomy of terms related to knowledge management that reflect the desired scope and outcome of the knowledge management efforts approved by the organization's senior leadership (Davis, 1998; Fahey & Prusak, 1998). In their article, "The Eleven Deadliest Sins of Knowledge Management", Fahey & Prusak identify the lack of developing a working definition of knowledge as the critical error that directly contributes to the other ten knowledge management errors noted in their article. It is a common practice of project management to establish a "project vocabulary" of key terms whose meanings everyone knows and understands and knowledge management projects are no different. A single agreed-upon vocabulary is a key step towards

organizing the firm's organizational capital and making it available to users. To ensure everyone understands the intended focus of the project efforts, desired outcomes, scope, performance metrics, etc., there needs to be a single "project vocabulary" to minimize confusion and misinterpretation when discussing key aspects of the knowledge management project, like what knowledge should the project be focused on utilizing.

STEP/PHASE 4 -- Identify & Address Knowledge Management Project Variables Affecting Project Implementation & Success

Key Factors Affecting Decision Process

- Senior leadership interest & project sponsorship
  - Need continued a Need knowledge management champion and project sponsor active participation and involvement from senior leadership
- Identify customer(s)
- Define requirements of knowledge management effort/project
  - Capture & codify desired knowledge
    - Capturing & reusing past experiences
  - Share knowledge (tacit & explicit)
  - Access knowledge
  - Reutilize knowledge
    - Capturing & reusing past experiences
  - Create New Knowledge
    - Collaboration
    - Knowledge Sharing
- Develop project goals, expected outcomes and performance measures
  - Use performance measures/metrics to tie daily business activities to strategic objectives

Key Decision

- Is there a good probability that the knowledge management project will succeed ?

Theoretical Support for Step 4 Key Factors

Step/Phase 4 is primarily focused on the identification of project variables for those potential knowledge management projects identified in Step 3. The potential

knowledge management opportunities and limitations identified in Step 2 drove the identification of potential projects identified in Step 3 and each potential project identified in Step 3 will have certain factors associated with it that will affect the selection and implementation of that project. These project variables will be situationally dependent on the organization's requirements and the analysis performed in Steps 1-3. Steps 4 & 5 should be viewed as a dyadic process; Step 4 identifies general project variables and Step 5 identifies general success factors that will impact each of the identified project variables to varying degrees based on the potential projects identified in Step 3 and on the project goals, expected outcomes and performance measures identified in Step 4. There is no way to address all of the potential project variables here and since the project variables are directly dependent on the type of project selected, only a generalized look at project variables was presented.

Knowledge utilization can be broken down into three broad categories: Knowledge Generation, Knowledge Codification & Classification, and Knowledge Transfer (Davenport & Prusak, 2000). There are a multitude of different projects that fall into each of these categories, and many that could fit into all three categories. To provide a process oriented focus, this section identifies five basic processes that affect the implementation and utilization of most knowledge management projects : Capture & Codify Desired Knowledge, Access Knowledge, Share Knowledge, Reutilize Knowledge, and Create New Knowledge.

The first process concerns the capture and codification of desired knowledge. The organization's definition of knowledge was identified in Step 3 and should reflect the types of knowledge the organization has determined to be valuable to achieve its strategic

objectives. At this point, there can be some varying definitions of knowledge that are dependent on the type of knowledge management project you are evaluating. Knowledge generation efforts can involve multiple forms of knowledge, from the tacit knowledge that resides within the individual and is uncaptured, to the process knowledge that is embodied in the business processes and methods used by the organization to achieve its mission, to the formal explicit knowledge that has been captured and recorded. There are different factors associated with each of these types of knowledge and as a potential project manager or decision maker, you will have to make a decision on how to best implement the desired project.

Organizational culture is a key enabler to any knowledge capture effort; the knowledge providers within the organization must be convinced that the time and effort they spend on knowledge contribution is seen as valuable to the organization and the organization recognizes the value of their individual contributions. The capture of tacit knowledge is typically seen as the most difficult to achieve because it requires the individual to voluntarily contribute their knowledge to the organization in some format that can be captured and codified for use at a later date.

One of the best ways to facilitate the capture and codification of knowledge is by imbedding it in the organizations operating procedures (Bourdreau & Couillard, 1999, Davenport, 1999). IT can play an important part in this process by making the knowledge capture and codification process relatively transparent to the knowledge providers and users within the organization. For instance, automated knowledge pointers can be used to identify individuals who are interested in, contributed, or used a specific type of knowledge. This information can be captured unobtrusively and be used to help map an

organization's existing knowledge or become the starting point for developing communities of practice. The advantage of using a knowledge pointer system instead of trying to capture knowledge is that the knowledge stays with the knowledge originator.

A key issue to address when trying to capture tacit knowledge is the underlying context associated with the tacit knowledge. For captured information to be useful, it must be able to be applied to some problem after it's been captured. For tacit knowledge, much of the value of the knowledge resides in the context in which the knowledge was created and used (Fahey & Prusak, 1998; O'Dell & Grayson, 2000). For instance, a best practice is an example of tacit knowledge that is being captured for future use. Much of the value of the tacit information can be lost in the transition to explicit information if the context underlying the tacit information is not captured and recorded.

Another method is to have intelligent agents (software programs) that monitor an organization's core business processes, recording information that is valuable to the organization, making it available to users, and monitoring use of that information. Trend analysis can be conducted on this data and its use, and the organization's core business processes could be adjusted to make them more efficient, thereby using human analysis of business information to create knowledge which can be used to add value to the organization. The key points here are:

- Make the knowledge capture and codification an integral part of the way the organization conducts business
- Make the process as non-intrusive as possible to the knowledge providers and minimize as much as possible the additional time required to capture the knowledge
- Capture the context surrounding the knowledge as well (how it was used, why was it used, what made it valuable in this situation, who created it, etc.)

Once knowledge has become captured and codified, the next step is to look at how the knowledge will accessed. IT has become one of the key enablers of knowledge

access. Knowledge access is dependent on how the knowledge will be utilized to the extent that the method of utilization will determine how and where the knowledge must be accessed. Both of these are functions of IT and the IT infrastructure will play a major role in the ability of knowledge users to access and utilize organizational knowledge. The focus should be on making the right organizational knowledge available to the right users, in the right format, and in a timely manner. Another factor is the ability of the knowledge user to locate the specific information needed in a timely manner and in a format that meets the users needs. Two methods of providing users access to knowledge are push technology and pull technology. Both strategies have advantages and disadvantages. The advantage of push technology is that the knowledge user/worker doesn't have to search to find knowledge that is pertinent to the organization, knowledge the organization has determined as valuable is automatically pushed out to the user. The disadvantage of push technology is that the user is not in control of the knowledge pushed out to them and information overload occurs (it never becomes knowledge to the user because they are unable to understand and utilize all the knowledge pushed out to them. Pull technology is the flip side to this coin. In Pull technology, the user only receives the information they feel is important to them. The advantage is that since the user is requesting the knowledge, they will be more likely to assimilate the "information" they receive, comprehend it, and convert it into knowledge that they can then apply to a business problem. The disadvantage is that there might be some valuable knowledge residing somewhere within the organization that is valuable to the employee, but they will never know about it since they are unaware it exists and don't ask for it. When using pull technology, it is important to have the right IT interface and some intelligent search

mechanisms that will enable the user to find the information they need. Push technology can also be used in conjunction with IT and pull technology to customize the type of information that is pushed out to the knowledge worker. Based on historical knowledge use rates or user defined parameters, the knowledge pushed to the user can be customized to meet their needs.

The next process discussed is knowledge creation. Two components of knowledge creation are access to other forms of knowledge within the organization and an organizational culture and environment that promotes the utilization of existing knowledge repositories (explicit, tacit, and process) to create new knowledge. In a knowledge-centric organization, knowledge creation is the result of knowledge sharing and collaboration. Knowledge sharing can be something as simple as documenting a business process and placing it in a best practices repository for everyone in the organization to use or it can be something as complex as collaboration with other knowledge holders in a virtual environment over a desktop video-teleconference. A concept common to the knowledge creation process in the current IT intensive environment is that it is a human-based process that is initiated by people and is enabled by IT. The synergy created by matching a user who is searching for a particular form of knowledge and the holder of that knowledge will result in the development of additional knowledge. This might just be existing knowledge that is transferred to another user (where it becomes new knowledge within the new user) or it could be the creation of knowledge that did not previously exist within the organization. As you can see, knowledge sharing is an integral part of the knowledge creation process and access is the

enabler that allows knowledge to be shared across the organization, fostering collaboration and the creation of new knowledge.

The last process addressed is knowledge reutilization. Two critical factors here are the ability to apply captured information to an existing or a new business problem by someone other than the original creator of the knowledge and the currency of the knowledge. Earlier we discussed the need to capture the knowledge context as well as content. The knowledge content is only part of what makes the knowledge valuable to the organization. The knowledge context is also needed because this provides the rest of the picture; how the knowledge was used, why was it successful, what makes it unique, how to best apply it, etc.. At the same time, there needs to be some way of maintaining currency of the organization's knowledge repositories to ensure the knowledge stored there is still valuable to the organization and reflects the current strategic priorities and business practices of the organization. Best practices and lessons learned knowledge repositories are two of the most common forms of knowledge management projects implemented (Davenport & Prusak, 2000) and there are key factors that can directly impact the success or failure of these types of knowledge management projects. Two key factors identified in numerous articles (Davenport et al., 1998; Fahey & Prusak, 1998; O'Dell & Grayson, 1998; Szulanski, 1996) are the ability of the knowledge user to understand the context in which the knowledge was created and the ability to be able to then take that knowledge and apply it to another business problem within the organization. In a study of the transfer of Best Business Practices within firms, Gabriel Szulanski (Skulanski, 1996) identified a characteristic of knowledge transfer called "lack of absorptive capacity" that is manifested when the knowledge receiver is unable "to

value, assimilate and apply new knowledge successfully to commercial ends." The term "absorptive capacity" was initially created to describe how "prior related learning confers and ability to recognize the value of new information, assimilate it, and apply it to commercial means"(Cohen & Levinthal, 1990:2) and collectively, these abilities constitute absorptive capacity. The way to avoid this lack of absorptive capacity is to use a combination of push and pull technologies and to capture knowledge context in conjunction with knowledge content (O'Dell & Grayson, 1998; Szulanski, 1996)

Step 4 is important because this is where specific projects are tied back to the organization's strategic objectives. The most effective way to implement this is through the identification of project goals, the articulation of expected project outcomes based on the organization's strategic requirements and dictated by the project's scope and operating parameters, and the identification and/or development of some method against which to measure project performance. Knowledge management theorists are reluctant to try to quantify the concepts of knowledge for fear that managers will begin to measure knowledge using methods that are not conducive to the effective utilization of knowledge (i.e. that don't correspond to the fundamental principles of knowledge management) (Bukowitz & Williams, 1999; Fahey & Prusak, 1998). However, business leaders agree that there must be some way to measure the success of the organization's knowledge management efforts. If knowledge management practitioners expect to continue to receive the active participation and support from senior leadership necessary for effective knowledge management practices, then they must be able to show how the knowledge management effort is contributing to the organization (APQC White Paper, 2000; Glazer, 1998).

The key here is to look past traditional measures of performance and develop valid, reliable measures of knowledge. In their article *The Eleven Deadliest Sins of Knowledge Management*, Liam Fahey & Laurence Prusak identify an organization's desire to "develop direct measures of knowledge" as one of the key behaviors that lead to the failure of knowledge management projects. As stated previously, knowledge management is a different process than most other management functions (Davenport et al. 1998). Senior leadership support and active participation is more critical than on other projects of similar scope and the senior leadership of the organization needs to be an active, visible agent of organizational change. One of the changes that occurs in an organization that becomes knowledge-centric is that when the focus turns towards knowledge and a process oriented approach to solving business problems, the traditional measures of individual productivity don't necessarily apply.

For instance, a typical problem associated with measuring employee productivity in a knowledge-based organization is the individuals who contribute to knowledge management do not usually directly benefit from their individual contribution. If employees are not recognized for their knowledge contributions, then it will be difficult to persuade them to take the necessary time to contribute their unique knowledge to the organization's knowledge base. Instead of tying performance measures and metrics to traditional concepts like quantity of knowledge inputs, number of times a knowledge management effort is utilized, database hits, and size and quantity of explicit knowledge stored in repositories, performance measures should attempt to capture the business outcomes of knowledge management.

Measures should seek to identify business trends that have been positively impacted by the implementation of knowledge management and senior leadership will have to play an active and visible role in changing the way the organization operates and evaluates performance and productivity. Some business examples are new products developed and introduced, customer retention, and process innovation. Some military examples would be decreased cycle time for Air Tasking Order (ATO) generation, decreased usage of network customer call centers due to increased user education and knowledge access, and shortened project fielding timelines due to increased collaboration between the various functional entities, starting at the inception of the project and continuing throughout the project lifecycle. These types of performance measures provide a more accurate assessment of the knowledge management project's contribution and they also tie expected project outcomes to core business practices by linking the everyday operating environment to the organization's strategic objectives through the use of well-reasoned, logical performance criteria.

STEP/PHASE 5 – Identify & Address Success Factors For Project Variables Affecting the Successful Implementation of Knowledge Management Projects

Key Factors Affecting Decision Process

- Senior leadership interest & project sponsorship
  - Need continued active participation and involvement from senior leadership
  - Need knowledge management champion and project sponsor
- Knowledge management project should provide substantial & measurable value to the organization
- Employee compensation should be structured to encourage employee utilization

- Goal should be to institutionalize knowledge-based behavior into organization
- Compensation is not necessarily financial; can be any compensation, including recognition on performance appraisals, that promotes the sharing and utilization of organizational knowledge

- Policies & guidance developed to support & encourage knowledge management use and acceptance
  - Goal should be to develop and implement policies and guidance that promotes a knowledge-centric culture
  - Promote creation, sharing, & utilization of organizational knowledge bases
- Tie knowledge management project to business process
- Knowledge management projects should be focused on people & processes, not technology
- Identify factors that potentially impact the identification and mapping of knowledge repositories
- Can the knowledge management project be implemented with the existing organizational structure and organizational culture?

  A determination needs to be made; can the project be implemented now, given the existing organizational culture & structure, or does some form of change management need to take place within the organization before the project is deployed?

Theoretical Support for Step 5 Key Factors

Step/Phase 5 of the framework is distinct from Step/Phase 4 in that it identifies general factors that have been found to be closely associated with and highly correlated to successful knowledge management projects. Although the success of a knowledge management project is dependent on the organization's definition of success (as reflected

in the project goals, expected outcomes, and performance measures & associated metrics developed in Step 4), there are several attributes that have come to be seen as indicators of success (Davenport et al., 1998; Davenport & Prusak, 2000). These are:

- Growth in the resources attached to the project, to include staff and funding
- Growth of organizational capital; specifically that capital the organization has defined as important to the strategic success of the organization
- Increased usage of organizational capital
- Continued sustainment of the knowledge management beyond initial implementation
    - The project is seen as an organizational initiative, not someone's pet project
- Increased acceptance throughout the organization regarding the concepts of knowledge and knowledge management
- Some visible proof that the project is providing substantial and measurable value to the organization

Earlier it was discussed that organizational change efforts needed to precede any knowledge management initiative to prepare the organization to establish a foundation for knowledge management to flourish. The organizational change efforts are dependent on the analysis of the existing organizational structure and culture initiated in Step 2. Here is where the specific policies and guidance can be developed to promote the organizational change effort initiated by senior management. They set the stage by advocating the need for change and articulating the link between that need and the organization's pursuit of knowledge management. Here is where the actual policies and guidance can be developed to implement that organizational change on a daily basis and at a level that individuals can identify with. The policies

and guidance should be developed to encourage the utilization of the knowledge management projects identified for implementation in Step 6 and incorporated into the organization's existing business processes. Incorporating the knowledge management effort into the organization's core business processes will encourage the institutionalization of knowledge management into the organizational culture (APQC White Paper, 1999; Davenport & Prusak, 2000; O'Dell & Grayson, 1998).

Coupled with this effort is the need to structure employee compensation to encourage the acceptance and utilization of the knowledge management initiatives in accordance with the policies and guidance developed (Hanley & Dawson, 2000; Kanter, 1999, Nissen, Kamel, & Sengupta, 2000). The nature of knowledge management is that very often the people who invest the time and effort to share their knowledge or document their processes, seldom benefit directly from those efforts. While the organization as a whole benefits greatly and the individual users of an organization's knowledge capital benefit directly, those individuals who are knowledge contributors seldom see any direct benefits of their efforts. We can create policies, directives, and mandates all day long, but unless there are mechanisms in place that recognize the contributions of the knowledge providers, there will be reluctance to dedicate the time and effort needed to establish, maintain, and expand an organization's knowledge base. Employee compensation should be focused on developing a knowledge culture within the organization and can take on a variety of forms; from the recognition or key knowledge contributors and users, to the incorporation of knowledge contribution as a measure of employee performance, to

the establishment of employee bonuses tied to the achievement of key performance metrics that support the organization's knowledge management initiatives.

The last key point to reiterate is one introduced in Step 3; knowledge management efforts should be focused on people and processes, not the technology. As stated before, knowledge is a process-oriented, human-centric concept and the primary purpose of knowledge management is not to control and manipulate knowledge in the same way organizations control and manipulate their financial and physical resources. Knowledge management is about providing the right environment to encourage the growth, sharing, and utilization of an organization's existing organizational knowledge (organizational capital) to address specific business problems and ultimately, add value to the organization by assisting in the achievement of the organization's strategic objectives.

STEP 6 – Finalize Knowledge Management Project Selection

III. METHODOLOGY

> A decision framework is essential for the selection of an enterprise information system. Learning to follow (a) framework provides assistance to organizations in identifying common challenges encountered by project teams when selecting and implementing enterprise information systems. By choosing the right team and partners and by choosing the right system and data design, companies can substantially increase the performance of their enterprise system.
>
> (Lee, 1998)

Introduction

A framework is defined as a basic conceptual structure of ideas (Merriam Webster's Collegiate Dictionary, 1995) that illustrates and simplifies the elements that constitute a complex concept or construct. For the purpose of this research effort, the author will view a framework as a frame of reference that describes a complex concept (a construct) in terms of key factors, constructs, or variables and their relationships for the purpose of theory building (Miles & Huberman, 1994). A framework is useful because it serves as a guide for identifying, categorizing, and understanding the myriad of ideas, issues, and interrelated components underlying and supporting a complex construct or phenomena.

Originally used to describe the skeletal structure of a building, the term framework is now used to describe natural occurrences, guide the development of software programs, and establish common sets of standards for everything from government policy to telecommunications hardware to software applications. Frameworks can be descriptive in nature (identifying and explaining elements of a particular construct) or they can be prescriptive (suggesting or recommending a particular

methodology for achieving a desired result). A framework can be either generic (universally applicable across a wide variety of situations) or specific (has a more limited degree of applicability).

The goal of this research effort is to provide a framework that can be used as a roadmap to guide the decision-making process for selecting projects that support an organization's enterprise (corporate-wide) knowledge management initiatives. The framework presented will be a generic prescriptive framework: generic in that it may support the decision selection process for a wide variety of applications and prescriptive in that it provides a roadmap to follow when selecting a knowledge management project. There has been a great deal of research regarding frameworks that describe knowledge management in general terms (Davis, 1998; Lia & Chu, 2000) and numerous articles describing specific aspects of KM projects (Davenport & Prusak, 2000; Fahey & Prusak, 1998; Snowden, 1998); however, there was not any existing literature in evidence which provided a comprehensive framework or methodology for selecting different KM projects across a large organization. Several searches of existing academic and business literature related to knowledge management were conducted using the on-line search engines *FirstSearch*, *EBSCO*, and the Internet search engines *Google* (www.google.com) and *AllTheWeb* (www.alltheweb.com). This preliminary research of existing literature regarding knowledge management theory, business practices and projects did not reveal any existing framework that would provide decision-makers with a consistent, comprehensive methodology for selecting different KM projects to support a specific corporate strategy. No framework was found that was specifically intended to guide the

selection of KM projects; the closest published framework this author was able to find was an enterprise decision framework for selecting information systems (Lee, 1998). Chapters 1 and 2 of this thesis established the need for some methodology for selecting KM projects that provides a unified view of how a decision maker or project manager should proceed when selecting a KM project to support an organization's corporate-level strategic objectives. The framework developed and presented by this research is intended to fulfill that need. Such a framework can benefit practitioners and researchers by providing a starting point in the planning process and an initial working standard that would be consistent across the Department of Defense (the intended recipients of this research).

Overview of Methodology

The methodology used to conduct this research has 3 distinct phases. Phase one is where the framework is initially developed, framework evaluation criteria are established, and the initial survey mechanism is developed. The second phase is where the framework is evaluated and validated through the use of a modified Delphi method. In phase three, survey results of the Delphi group are analyzed, the final framework is presented as the product of this thesis, and recommendations are made concerning the final framework and potential future areas of research concerning the decision making process for knowledge management project selection.

Delphi Forecasting Method

The Delphi method is a forecasting technique that was developed by the RAND Corporation in the early 1950's for the United States Air Force (Erffmeyer et al., 1986) as

a way of utilizing the expertise of a group of experts in a specific area while minimizing the negative aspects associated with group interactions (social, personal and political conflicts, group think, etc.) (Rowe & Wright, 1999). The Delphi technique reduces these psychological factors by eliminating the need for physical interaction amongst the members of the group of experts. The technique is intended to "obtain the most reliable consensus of opinion of a group of experts...by a series of intensive questionnaires interspersed with controlled opinion feedback" (Dalkey & Helmer, 1963).

Originally developed as a method of forecasting solutions to strategic military problems, the Delphi technique has evolved extensively since its inception. Generally regarded as a reliable forecasting method (Brancheau, 1996; Ono & Wedemeyer, 1994), the Delphi technique can be applied to an situation to which quantitative values (dates, weightings, or scalings) may be assigned" (Coates, 1978). One of the strengths of Delphi is its ability to capitalize on the expertise of individuals in a group process to encourage the identification and development of new ideas and diverse viewpoints (Brancheau, 1996; Nambisian, Agarwal, & Tanniry, 1999) without the negative aspects associated with group interaction. Consistent with this study, the Delphi technique has been used for policy formation, decision making, and resource allocation (Clayton, 1997; Linstone, 1978) in the area of information systems (Nambisan, Agarwal, & Tanniru, 1999; Rowe & Wright, 1999; Westbrook, 1997).

Reasons for Using the Delphi Method for this Research

The primary intent of this research effort is to produce an initial working model, or framework, that can be used by knowledge management practitioners for selecting KM projects to support a corporation's strategic objectives and use qualitative methods

(Delphi study) to assess the framework for accuracy, completeness, and comprehensiveness. The Delphi study will also propose modifications to the initial framework. This new model can be used as a basic starting point for further research into the area of knowledge management project selection and the strategic application of knowledge management through the use of knowledge management projects and applications. As stated previously, a review of existing literature did not disclose any information concerning a KM project selection framework. While there has been some research on the theory behind specific types of KM projects and the implementation of KM projects, a specific framework has not been presented that ties these various strains of research together in a cohesive, understandable manner. Rather than build on an existing framework, this research effort proposes an initial framework based on a review of existing literature and the experience and intuitive judgment of the author and other practitioners and researchers in the field of knowledge management.

The appropriate research methodology for this type of research is the Delphi method. Delphi is intended for use in instances where human judgment and intuition (based on the experience and expertise of the participants) is necessary because there is a lack of appropriate historical, economic, or factual data available to utilize model-based statistical methods (Gordon, 1992). The Delphi method also allowed the researcher to gain the participation of the Department of Defense's key knowledge management practitioners and researchers; those responsible for policy, direction, and implementation guidance throughout their respective organizations. The responsibilities, time and cost constraints of each participant's job would not have allowed for their participation in a more conventional, committee-type group setting; however, they were able to participate

as members of a Delphi committee due to the virtual nature of the committee arrangement.

Another advantage the Delphi method afforded this research effort was the ability to included participants from various organizations and from various organizational levels within those organizations. Those responsible for corporate policy development and decision making participated on an equal basis with those individuals who were tasked to implement those policies and decisions. Also, individuals whose primary focus was knowledge management research participated alongside knowledge management practitioners. The participation of this diverse group of individuals, both cross-functional (Army, Navy, Air Force, etc.) and intra-organizational (those who made policy decisions participated with those responsible for carrying out their decisions), required a degree of anonymity that could not be accomplished in a traditional group setting. The Delphi method permitted the appropriate level of anonymity while still allowing the researcher to utilize the necessary cross-section of participants necessary to form a heterogeneous Delphi panel (Clayton, 1997). This researcher determined that a heterogeneous Delphi panel (individuals with expertise in a particular area but coming from different social/professional/organizational levels) was more desirable than a homogenous panel (experts from the same discipline and organizational level) to capture a wider diversity of viewpoints, expertise, and experience from within the DOD. Increased panel diversity will help validate the results from the research effort and provide a more accurate and comprehensive result (the framework) than if a homogenous panel of experts, providing a narrower viewpoint, was used. Utilizing a larger variety of viewpoints and expertise to validate the initial framework will have the effect of increasing the predictive accuracy

and reliability of the final framework (Clayton, 1997; Ono & Wedemeyer, 1994; Rowe & Wright, 1999). It will also decrease the probability of bias that could arise from the use of a panel with more homogenous viewpoints (Lindstone, 1978). Finally, the Delphi method is not only desirable for its ability to identify consensus amongst a group of experts; it also is useful for its ability to identify those areas where there is not consensus. For the purpose of this research effort, it is desirable to identify those areas where there is consensus because the intent of the proposed framework is to identify a consistent methodology. Identifying agreement between those individuals responsible for developing and implementing knowledge management policy guidance and direction for their respective organizations will enable this research to present a framework and methodology that is based on sound knowledge management principles that are already accepted throughout the DOD knowledge management community. Framework elements for which consensus is not identified will provide the starting point for future research.

> ***"The value of a Delphi study rests in the ideas it generates, both those that evoke consensus and those that do not."***
>
> **(Gordon, 1992)**

Each item incorporated into the initial framework is rooted in business principles based on existing literature substantiating its inclusion into the proposed framework. Elements that do not achieve consensus identify potential business/management practices and methodologies that might differ from those exhibited in the commercial sectors. As such, elements for which there is non-consensus will provide valuable information for future researchers.

Phase I: Framework Development

In this phase, the scope of the research project is identified and the framework is initially developed, methodology and criteria for evaluating and validating the proposed framework are established, and the survey mechanism is developed to evaluate the proposed framework.

Project Scope Identification

The proposed framework is intended for use primarily within the Department of Defense, although there is likely a great deal of applicability for its use within large, multi-functional organizations within the government and commercial sectors. The focus of the proposed framework is to provide a consistent methodology and process flow for decision makers to follow when identifying and selecting individual knowledge management projects to meet specific requirements while still supporting the overarching strategic goals of the entire organization. The members of the Delphi committee used to evaluate and validate the proposed framework all are drawn from within the Department of Defense and the majority of participants are career government employees. Their expertise reflects the managerial and business processes and methods utilized within the DOD. While these managerial and business processes are relatively consistent with those utilized in large, multi-functional organizations in other branches of the government and within the commercial sector, the unique mission of the DOD requires a greater reliance on both short-term and long-term strategic planning than might normally be required in some commercial and government organizations. As such, there are certain aspects of the

proposed framework that might not be applicable to all commercial organizations or some smaller, uni-functional government organizations.

Framework Development

An initial literature search was conducted using the research tools *FirstSearch* and *EBSCO* (both are available for use through the Air Force Institute of Technology Library) and the on-line search engines *Google* (www.google.com) and *AllTheWeb* (www.alltheweb.com). Within *FirstSearch*, academic and business journals, conference proceedings, dissertation databases, and library reference databases were searched. Within *EBSCO*, both academic and business databases were searched. Searches were conducted using key words or phrases containing the following:

- *Knowledge management*
- *Knowledge management theory*
- *Knowledge management references*
- *Knowledge management framework(s)*
- *Knowledge management practices*
- *Knowledge management projects*
- *Project selection*
- *Project selection criteria*
- *Framework development*
- *Definition of a framework*
- *Strategic planning*
- *Corporate strategy*
- *Communities of practice*

- *Organizational knowledge*

The following websites within the .mil domain were also reviewed for materials that pertained to knowledge management and its utilization in organizations within the DOD:

- www.army.mil.ako
- www.doncio.navy.mil
- www.km.gov
- Air Force sites (.mil restricted) dealing with strategic management, IT management, IT and IM policy, planning, and guidance, knowledge management research and policy development

Literature searches were conducted periodically during the initial research phase to capture any recently published information. A literature review was conducted utilizing the available literature and key points were identified to form the theoretical basis of the initial framework. These key points were organized into a rudimentary framework and the framework was refined through numerous iterations into the initial complete framework that was presented to the Delphi committee for their review. The framework consists of a six-part framework and an associated decision flow diagram that graphically represents the decision process recommended by the framework and associated key sub-tasks, decision steps, and key factors affecting each decision step. The framework is constructed in a lock-step fashion so that a decision must be made at the end of each step of the framework before the decision-maker can move onto the next step in the framework. The methodology and purpose behind the framework construction are explained in detail in Chapter 2.

There are several approaches that can be taken to develop a framework. One method is to use one's own individual creativity and expertise, drawing on their unique experience and observation (can be in the form of individual interviews with subject participants) to develop a framework. Another method is to use an existing framework and expand upon that framework to incorporate the concept or process the researcher is trying to capture. When no framework exists, the researcher can collect existing research on the area of interest and on existing constructs related to the area of interest that is being researched and use that information to form the basis for their framework (Choo, 1996; Szulanski, 1996). A fourth approach is actually a synthesis of the three previous approaches, using the researcher's experience and observation, existing research related to the area of interest, and existing frameworks in similar topics closely associated with the area of interest being researched. This fourth approach is closely related to the process of matching, which is commonly used for generating new theory. In the context of this research effort, the development of a new framework in the absence of any existing framework can be viewed as a form of theory generation. For this framework development process, the term "matching" means consolidating, synthesizing, organizing and integrating theory, concepts, observations, and experience and their interrelationships that are identified and exercised both in theory and in practice (Krogh, Roos, & Slocum, 1994) into a single unifying framework. A framework developed utilizing this method not only incorporates elements of existing frameworks, theory, and practice discussed and identified in existing knowledge management literature, it allows for the incorporation of related elements that were not previously considered or incorporated into the existing literature (Davé, 1998).

Framework Evaluation/Validation Criteria Identified & Survey Mechanism Developed

The framework presented to the Delphi committee was evaluated for accuracy, comprehensiveness, completeness, and usefulness. The key points identified during the literature review were modified and revised to create the survey items for the Round One Survey; these key points form the basis of the evaluation survey mechanism used by the Delphi committee to evaluate/validate the initial framework. A 6-item Likert scaled response was used to identify the level to which each Delphi participant agreed with the following statements. A 6- item scale was specifically selected to eliminate the "no opinion" selection and encourage panelists to make a decision. Each participant is an experienced policy maker, practitioner, or researcher in the knowledge management field within the military field. It was felt that, given each panelist's current position and responsibilities, they should have an opinion on each survey item. The following statements were used to assess the accuracy of the framework:

- This framework accurately identifies the key decision-making processes that should occur when selecting and implementing a knowledge management project.
- This framework accurately identifies the key decision variables for each key decision-making process.

The following statements were used to assess the completeness and comprehensiveness of the framework:

- This framework successfully captures the key decision-making processes that should occur when selecting and implementing a knowledge management project.
- This framework successfully identifies the order in which the decision-making processes should occur when selecting and implementing a knowledge management project.
- This framework successfully identifies the key decision variables to be considered when selecting a knowledge management project.

The following statements were used to assess the usefulness of the framework:

- It is important to have a framework identifying key decision variables that decision-makers should address when selecting a knowledge management project.
- Utilizing this framework will ensure the selected knowledge management project will have a higher probability of success when implemented than if this framework were not utilized.

Additionally, key aspects of the underlying theory used to develop the initial framework were evaluated for their applicability and importance to the development of the initial framework. These key aspects were grouped into the four categories identified below:

- Statements used to help guide the development of the decision flow and order of each decision identified in the decision process.
- Statements used to help guide the identification of critical project variables that directly affect a knowledge management project's implementation and ultimate success.

- Statements used to help guide the identification of success factors for project variables that directly affect a knowledge management project's implementation and ultimate success.
- Key statements that provide some of the theoretical foundation supporting this framework.

A modified version of the Delphi method was used in this research effort. Conventional Delphi techniques normally begin with an unstructured round that is intended to capture information that experts in the field of study feel are pertinent to the research being conducted. When the research effort is not primarily geared towards using expert input to structure the research effort, but rather desires to use the expert's opinions to evaluate and validate research the researcher has conducted, a modified version of the Delphi technique is used (Clayton, 1997; Martino, 1978). To compensate for this lack of initial input, several open-ended questions were incorporated into the survey mechanism used by the Delphi committee, allowing them to contribute to the framework construction and overcome potential concern that the modified Delphi technique weakened the final results (Rowe & Wright; 1999).

Phase II: Framework Evaluation/Validation

In this phase, the survey mechanism developed in phase I is presented to the Delphi committee for their use in evaluating the framework developed in phase I. The theory underlying the framework is also evaluated and its applicability to the framework is validated.

Delphi Committee Development and Participant Selection

The key to a successful Delphi study lies in the selection of the participants.
(Gordon,1992)

A key aspect of any Delphi study is the selection of experts to participate in the Delphi study. The results of any Delphi study are based on the level of expertise of the participants and care must be taken to ensure the right type of experts are identified and utilized. The first step is to identify the type of expertise required to achieve the goals of the research effort. In this instance, experts who had considerable experience in the area of knowledge management and strategic policy development and implementation were required. To ensure the final product of the research effort was applicable across the DOD, it was necessary to garner input from multiple service organizations (Army, Navy, and Air Force) and to gather input from organizations that dealt with each service organization at a level removed from intra-organizational politics. Each potential participant was identified based on their current responsibilities as they related to knowledge management. To capture the required diversity of perspectives needed to validate the proposed framework, participants needed to represent a variety of interest areas related to knowledge management practice. Inputs were needed from those individuals who developed the strategic direction and policy that formed the basis of the proposed framework. Inputs were also needed from those individuals who would potentially utilize the proposed framework; those individuals who are knowledge management practitioners and were responsible for selecting and implementing knowledge management projects that would support and sustain the strategic objectives

and visions of their respective organizations. Input was also needed from the academic and research communities so that the usability and future viability of the proposed framework could be assessed against a perspective of the future direction of knowledge management. At the same time, the expertise of the participants needed to reflect the intended scope of the project, which was to develop a framework that, while it might be applicable to commercial and other government sectors, was primarily intended for use within the Department of Defense.

The Delphi committee consists of knowledge management experts residing within the Department of Defense. The committee consists of the individuals responsible for creating knowledge management strategy, policy and guidance within the Army, Navy, Air Force, Department of Defense, and the National Defense University. Additional participants include those responsible for strategy and policy implementation, as well as project management of enterprise-wide knowledge management projects. The Delphi committee membership is rounded out by the inclusion of knowledge management practitioners, researchers and project managers who oversaw implementation of knowledge management projects on a smaller scale or were responsible for researching knowledge management applications for future use throughout their respective organizations. The majority of participants maintained a view of knowledge management from a strategic standpoint as it related to their organization's strategic objectives. Only one participant from each organization was included whose primary function was the development of knowledge management strategy, policy and guidance for their organization (the organization's Chief Knowledge Officer or equivalent) to mitigate the potential conflicts that may arise from conflicting opinions arising from within a

particular organization (Brancheau, 1996). Those responsible for implementing and overseeing large-scale knowledge management projects and initiatives were included to provide additional perspectives from the practitioner's point of view. Another concern was the differing views on knowledge management held by the commercial and academic communities (Demarest, 1995). Academic and technical researchers were included to provide a theoretical, and hopefully more scientific perspective to the practitioner's perspective. The goal was to identify individuals who were exposed to knowledge management from a corporate, enterprise-wide strategic perspective, with an understanding of both the near-term and long-term potential that knowledge management could provide to their organization and the implications that could have on the corporate strategic objectives of their individual organizations and the DOD as a whole.

A total of 15 individuals were selected for the Delphi committee. There is no clear consensus concerning the appropriate number of participants for a Delphi committee (Rowe & Wright, 1999), but the number seems to fluctuate somewhere between 7 (Dalkey & Helmer, 1963) and 15 (Westbrook, 1997). If the Delphi participants all come from the same discipline (e.g. computer programmers) the general rule of thumb is 15-30 participants, whereas a more heterogeneous population (expertise in the same area, but pulled from different social/professional levels) would only require 5-10 participants (Clayton, 1997). The 15 members of the Delphi committee for this research effort comprise a heterogeneous group of experts and the total number of participants should allow for an adequate diversity of inputs. The Delphi Group Contact Sheet (Appendix B) lists each participant and their relative demographic information. Table 3.1 profiles the

primary job responsibilities, related to knowledge management, of the Delphi members and Table 3.2 lists the breakdown of participants by organization.

Table 3.1 Primary Job Responsibilities Related to KM

Primary Responsibility	Delphi Participants
Chief Knowledge Officer (CKO) or equiv.	**5**
DOD Level Functional Process Improvement	**2**
Project Management/Oversight	**2**
Knowledge Management Policy Development/Implementation	**4**
Academic/Research	**2**

Table 3.2 Breakdown by Organization

ORGANIZATION	DELPHI PARTICIPANTS
DEPARTMENT OF DEFENSE (DOD)	**2**
ARMY	**1**
NAVY	**2**
AIR FORCE	**9**
NATIONAL DEFENSE UNIVERSITY (NDU)	**1**

Consensus

When the Delphi process was first developed in the 1950's by the RAND Corporation, identifying or achieving consensus amongst the panel of experts was a desired result of the process. The primary focus of research using Delphi at that time was long-range forecasting and it was desirable to achieve a consensus among the experts regarding a final specific projection. The success of a Delphi study was determined by the level of consensus achieved by the Delphi participants, the greater the level of

consensus, the more successful the study and the more accurate the final prediction would be . As the use of Delphi expanded, the ability of the process to identify and elicit new issues and differing perspectives was seen as a valuable benefit of the Delphi process (Brancheau, 1996). The success of Delphi was no longer judged solely by the level of consensus obtained (Scheibe, Skutsch, and Schofer, 1975); the ability to identify polarization or non-consensus was seen as a desirable outcome of the Delphi process as well (Linstone, 1978). For this research effort the identification of areas of consensus and non-consensus were both desired outcomes. In an emerging and evolving field like knowledge management, it is highly unlikely that a heterogeneous group of experts would achieve universal consensus on a great deal of issues. In this particular instance, there is no fully developed construct, nor has a great deal of research been conducted which would provide a foundation for a consistent level of agreement. The purpose of this research effort is to identify those areas, relative to the framework presented, where there is consensus and identify areas where there is no consensus. These results will help identify those areas of knowledge management where the DOD's methodology is consistent with the evolving methodology within the commercial sector. In those areas where there is no consensus, future research can explore the reasons why the DOD is pursuing a methodology that differs from what is being followed in the commercial sector, as it is researched and presented in academic and business literature and research efforts.

There are numerous ways to measure consensus; a decrease in the standard deviation between rounds (Dickson, Leitheiser, & Wetherbe, 1984), a reduction in variance of participant responses over successive rounds (Rowe & Wright, 1999), and a

stability of responses over succeeding rounds determined by a variation in average response of less than 15%, which is referred to as "Opinion Stability" (Scheibe, Skutsch, & Schofer, 1975:277).

For the purposes of this research effort, consensus will be determined by the measurement of individual responses and comparing those responses to a group average score. This group average score will be represented as the mean of the group responses for each question in the survey presented to the Delphi participants. A reduction in variance in succeeding rounds will be seen as a movement towards consensus (Rowe & Wright, 1999). When the item has achieved "opinion stability", the item will be recorded as having achieved consensus. For this study, the following definitions were used.

CONSENSUS:

- 90% or more of all respondents inputs fall within +/- 1 standard deviation (SD) of the group mean (fractional SD's are rounded to the nearest whole number >/= 1). Also, of the remaining 10%, no more than one (1) response can have a conflicting overall opinion than the group response [i.e., all group responses but one fall within the 1-3 range (generally disagree) or 4-6 range (generally agree)].

OPINION STABILITY:

- The average change between rounds is less than 15% (e.g. the average total response for the question changes less than 15%) and 80% of participants responses fall within one standard deviation of the group mean, extrapolated out to the nearest rating scale: +/- 1 rating scale of the group mean (12 participants out of 15 total)

It is important to remember that, although consensus of group response is being measured and recorded as a finding of the Delphi process, consensus of findings is not the only function of the Delphi process for this research effort. It is just as important to identify areas where there is not any consensus and also those areas where there is not yet consensus, but there is evidence of a trend towards consensus. These determinations will be determined during the analysis of findings discussed in Chapter IV

First Round

Prior to Round 1, the survey was pilot tested on 3 individuals within the AFIT IRM program. The framework was found to be satisfactory and only a few minor grammatical changes were made.

To begin Round 1, the survey (Attachment A) was sent out to each participant via e-mail as a MS Word 97 document. The survey consisted of textual information, MS Excel 97 spreadsheets (the questionnaire), and a VISIO decision flow diagram (the graphical representation of the initial framework). The Excel spreadsheets and the VISIO diagram were imported into the MS Word 97 document and the finished document was saved as a MS Word 97 document. Participants were asked to read the cover letter and fill out their contact information and identify if they did not wish to be included in the published list of participants. Each participant was asked to print out the graphical representation of the framework (page 2 of the survey file) and refer to the framework as they filled out the survey. The survey consisted of 5 sections, with 6-7 questions in each section. The first section consisted of open-ended questions and close-ended Likert scaled items. Each section had a sub-section reserved for comments related to that section. Participants were asked to record their responses directly into the electronic survey document, save their responses, and send the file back to me at my e-mail address. The participants were told to not worry about any format changes that occurred while they were filling out their survey; the documents would be reformatted without any loss of data after they were sent back to me upon their completion of the survey. Fifteen surveys were sent out and all were received back for a completion rate of 100%. Three surveys were received within the first week. A reminder was sent out to each remaining

participant via e-mail after four weeks and this was followed up with a phone call to each participant with 2-3 days. Five more surveys were returned within one week of the reminder and the rest were received within the following two weeks. Total response time for the first survey consisted of seven weeks. The analysis of round one results is described in Chapter IV.

Second Round

In Round Two, the survey was modified to include individual participant responses and to reflect some analysis of results acquired from the first round (Appendix E, G, &I). Those items for which consensus had been achieved in the first round were placed in a separate section with the consensus score identified for each item. Those items for which consensus had not yet been achieved remained in their original sections. The average group response (the mean) for each item from round one was included, along with the participant's Round One response. Any additional comments offered by participants from the first round that were intended to explain the participant's first round selection were also included. Each participant was asked to review their previous response and either modify it based on the Round One results or re-select their initial Round One response.

The responses from the open-ended questions in the Round One questionnaire that recommended changes, modifications, or extensions to the initial survey were placed in a separate section at the end of the Round Two survey and each participant was asked to evaluate whether they felt the proposed changes, modifications, or extensions should be incorporated into the framework. Level of agreement was measured using the Six-Item Likert Scale as was used in Round One.

Number of Rounds

This research effort consisted of a total of 2 structured rounds instead of the traditional 3 or more rounds. Instead of soliciting input from the Delphi committee and constructing the framework from that input, the initial framework was constructed using the methodology described above (Framework Development), allowing for the elimination of the initial unstructured, data-gathering round and proceeding directly to the first structured evaluation round (Clayton, 1997; Lindstone, 1978; Martino, 1978). There is also evidence that, although the number of rounds that can occur in a Delphi process varies, the process seldom goes beyond two iterations, during which time the majority of change generally occurs in the participants responses (Rowe & Wright, 1999). As stated above (pg. 80), "Opinion Stability" (Scheibe, Skutsch, & Schofer, 1975:277) was the measurement used to determine if the survey item achieved consensus within the two rounds specified by this study.

Phase III: Analysis of Survey Results, Framework Modification, and Recommendations for Future Research

In phase three, the survey results of the Delphi group are analyzed and any modifications suggested by individual committee members are either incorporated into the final framework or are identified for further research. Recommendations are made based on the analysis of survey results and the framework is revised to reflect the conclusions of the analysis performed in Chapter IV. Future research topics are identified in Chapter V.

IV. FINDINGS & ANALYSIS

"When you try to change a man's paradigm, you must keep in mind that he can hear you only through the filter of the paradigm he holds."
Myron Tribus

"The important thing about science is not so much to obtain new facts as to discover new ways of thinking about them."
William Bragg

Overview

Analysis from all surveys have been summarized and presented in the first part of this chapter as a summary of results. Included in this summary is a brief review of how the Delphi study was executed. General comments presented by Delphi members during the Round One survey have been incorporated into this summary, with some specific comments used to illustrate key points. Next, respondent inputs to the seven statements used to evaluate the framework and the three open-ended questions used to elicit proposed modifications to the framework are presented and discussed. Comments provided by respondents to a specific statement regarding the framework are incorporated into this section. In the third section, respondent inputs to the fifty-two statements used to identify key theoretical concepts that form the basis of the proposed framework are presented and discussed. In the fourth section, proposed modifications to the initial framework will be discussed and recommendations identified. In the fifth section, the results from both surveys will be analyzed and the results correlated with each research question to determine if these research questions were answered by this research effort. Concluding comments include a discussion of respondent inputs on why it is important to

have a framework for selecting a knowledge management project and what is considered a successful knowledge management project.

Summary of Results

The Delphi committee initially consisted of 15 members; one dropped out during the first round, leaving a total of 14 members that responded to the first round survey (Appendix C). The Round One survey consisted of seven statements and three open-ended questions evaluating the proposed framework and implementation methodology, fifty-two statements identifying key theoretical concepts used to develop the proposed framework, and two open-ended ended questions intended to elicit input on why a framework is important and what is considered a successful knowledge management project. Of those 14 members, all (100%) responded to the statements and questions pertaining to framework evaluation and 12 (86%) responded to the remainder of the Round One survey. Comments were summarized and incorporated into the second round surveys. Individual replies were consolidated and the aggregate input from the Delphi group was analyzed for consensus (Appendix D).

The second round of the Delphi process consisted of three separate surveys. The 1st Round Two survey consisted of items concerning knowledge management theory that achieved consensus in Round One and individual comments on why a framework is important and what each respondent felt was an appropriate measure of success for a knowledge management project (Appendix E); this survey was informational only and did not require a reply. The 2nd Round Two survey consisted of the seven statements pertaining to framework evaluation and the proposed framework modifications that were gathered from the three open-ended questions pertaining to framework evaluation

(Appendix G). The 3rd Round Two survey consisted of the remaining statements concerning knowledge management theory that did not achieve consensus in round one (Appendix J). A total of 12 Delphi members (86%) replied to the survey pertaining to framework evaluation (Appendix G) and 8 Delphi members (57%) replied to the survey that contained statements concerning knowledge management theory that did not achieve consensus in Round One (Appendix I). Only 6 of the individuals (43%) who responded to the Round Two framework survey (Appendix G) provided a response to the statements concerning proposed modifications to the framework. Inputs from the Round Two surveys were consolidated by function and the aggregate inputs of each function were analyzed for consensus: framework evaluation (Appendix H), proposed framework modifications (Appendix K), and statements concerning knowledge management theory (Appendix J).

Overall, the Delphi committee achieved consensus on 3 (out of 7) statements used to evaluate the proposed framework and on 37 (out of 52) statements used to identify key theoretical concepts that form the basis of the proposed framework. For this study, Consensus was identified using the following criteria:

- For Round One—90% or more of all respondents inputs fall within +/- 1 standard deviation (SD) of the group mean (fractional SD's are rounded to the nearest whole number >/= 1). Also, of the remaining 10%, no more than one (1) response can have a conflicting overall opinion than the group response [i.e., all group responses but one fall within the 1-3 range (generally disagree) or 4-6 range (generally agree)]. (Appendix G)

- For Round Two:
  - Framework Evaluation Statements (#1-7)—90% or more of all respondents inputs fall within +/- 1 standard deviation (SD) of the group mean (fractional SD's are rounded to the nearest whole number >/= 1). Also, of the remaining 10%, no more than one (1) response can have a conflicting overall opinion than the group response [i.e., all group responses but one fall within the 1-3 range (generally disagree) or 4-6 range (generally agree)].

- Knowledge Management Theory Statements (#1-7)—87.5% or more of all respondents inputs fall within +/- 1 standard deviation (SD) of the group mean (fractional SD's are rounded to the nearest whole number >/= 1). Also, of the remaining 10%, no more than one (1) response can have a conflicting overall opinion than the group response [i.e., all group responses but one fall within the 1-3 range (generally disagree) or 4-6 range (generally agree)].
  **The percentage was changed from 90% in Round One to 87.5% in Round Two because there were not enough replies to achieve a 90% consensus rate (need at least 10 replies and there were only 8 total replies for Round Two)*

Consensus was achieved in the first round on 23 (out of 52) of the knowledge management theory statements and additional 14 statements achieved consensus in Round Two. Of the 15 remaining knowledge management theory statements that did not acquire a consensus, opinion stability was achieved, indicating that the Delphi members who replied to both rounds were unlikely to change their responses in succeeding rounds.

Opinion stability was identified using the following criteria:

- The changes in individual responses between rounds for each item are identified and the absolute value of these changes are identified and aggregated by item. Each aggregated item is divided by two to determine net change per item. Net change per item is divided by total participants for that item to determine percent change per item between rounds. Opinion Stability on a survey statement is achieved when aggregated net change does not exceed 15% from one round to the next.

Three of the four framework evaluation statements that did not achieve consensus did achieve opinion stability. The only framework evaluation statement that did not achieve consensus or opinion stability was the statement that correlated the use of the proposed framework with a higher probability of success when implementing knowledge management projects.

An analysis of individual responses to the four framework evaluation statements indicates a bi-modal response based on organizational implementation of knowledge management. This interpretation of results will be discussed further in this chapter, but

briefly, there appears to be a correlation between the level of knowledge management implementation within the organization and the Delphi member's evaluation concerning the accuracy, completeness, and comprehensiveness of the proposed framework. With one exception on one framework evaluation statement, all respondents who did not agree with framework evaluation statements 2, 3, 4, & 7 are in other DOD organization besides the Air Force; organizations where knowledge management initiatives have been implemented for at least two years or longer. While these results indicate a correlation between organizational experience/exposure to knowledge management and a propensity to "slightly disagree" with the construction of the proposed framework (3 on a Likert response scale of 1-6), there is not enough evidence presented to establish a causal link between the two observations.

Consensus (100%) was achieved on 6 of the 20 proposed modifications to the framework (30%). However, since less than half of the initial Delphi members (43%) provided inputs to these proposed modifications in the Round Two survey (Appendix I), there is a possibility that these results to not reflect a true consensus for the entire Delphi group. These questions will be addressed in detail later in this chapter. Because of the limited response from Round Two regarding the proposed modifications, and the indication of acceptance of the existing framework by the sponsors of this research (via Delphi responses and individual communication), no changes were made to the initial framework and the proposed modifications are addressed in Chapter 5 as recommendations for future research.

Overall, while consensus was not achieved on all survey items, the majority of Delphi respondents (indicated by Group Mean and Group Median) in both Round One

and Round Two accepted the framework and implementation methodology as initially proposed (Appendices D & H). There was also a majority that agreed with 49 of the 52 knowledge management theory statements (Appendices D & H). The sections of this chapter that deal with analysis of the knowledge management theory statements specify the majority percentages for each question. The three statements which the majority of Delphi respondents disagreed with all deal with the identification of specific success factors for knowledge management project variables (factors that can affect the successful implementation of a knowledge management project) and will be discussed further in this chapter.

Looking beyond the aggregated results of individual Delphi responses, additional information beyond level of consensus can be acquired by looking at the Delphi responses from a broader, more holistic perspective. By analyzing the overall response patterns of each Delphi member, as well as the response patterns of sub-populations within the Delphi group and the level to which knowledge management has evolved within the organization to which these sub-populations belong, a tentative assessment can be made as to why consensus was not achieved on all seven statements regarding the overall framework.

The broad level of consensus with regards to the key theoretical concepts that form the basis of the proposed framework (consensus reached on 37 of the 52 statements and majority agreement on 49 of 52 statements) indicate the possibility that there is enough consistency of thought across the DOD at the senior leadership and km practitioner levels to warrant the establishment of a DOD-wide knowledge management construct founded on the theory statements included as part of this research. The

responses from the first and second rounds, combined with communications with individual respondents throughout the Delphi process, suggest that, while there are differences of opinion regarding knowledge management throughout the DOD, these differences arise not from conflicting theories of knowledge management, but are rather evidence of the evolutionary stage of knowledge management within the Delphi respondent's respective organization.

Results suggest that Delphi members belonging to organizations which have implemented, or are planning to implement, knowledge management as a catalyst for organizational change (they view knowledge management as a change agent) tend to look at knowledge management from a more holistic perspective; they see knowledge management should not be bound or limited by the process flow constraints imposed by a sequential process as presented in the framework.

- Framework statement #7—"here part of the thought is that some pretty complex processes are briefly stated concepts that I am not sure all will fully understand without more detailed guidance."
- Framework statement #3—"Yes, but at a VERY BROAD level, there would clearly be a need for a much more detailed document to support what is involved with some of the elements of this process."

(Delphi member comments: Appendix G)

These respondents were responsible for establishing knowledge management vision, direction, guidance, and policy for their respective organizations. Their responses seemed to indicate that they were more inclined to feel the framework provided a view of knowledge management that was too limited and did not account for all the ancillary issues related to change management. General comments from these Delphi participants indicated that the framework should be expanded and modified to include a greater focus

on organizational culture and developing a more holistic understanding of knowledge management.

Proposed modifications:

- "Organizational culture needs to be emphasized more"
- "Knowledge management is currently an emerging discipline that combines change, intellectual capital, and IT. Suggest framework cover all those bases"
- "supporting 'infostructure' and change catalysts such as policies, education & training interventions, and governance issues need to be considered"
- "suggest you continue framework (and responsibility for those using it and making the decision) well beyond the decision point...far into the implementation time-line (to give decision makers a personal stake in the outcome)"

(Delphi member comments: Appendix G)

The responses of Delphi members who belong to organizations where knowledge management either has not been implemented or is in the very early stages of implementing knowledge management into the organization seemed to indicate that they were more likely to accept the proposed framework as it was initially presented, with more specific recommendations for modification.

Proposed modifications (Appendix G):

- "We have to define the outcome(s) we want to achieve. How about ROI"
- "Define Performance Measure Metrics"
- "Could ask explicitly if knowledge management is already being done, just not being called that; and if so, what can be done to institutionalize, expand, and improve the sharing of knowledge across communities
- "You mention 'budget constraints' but I would like to see a more explicit cost-to-benefit consideration factor.
- "Team selection. I do not believe a knowledge management team should be IT folks exclusively or volunteers. One must have the right people. Need to define who are the customers"
- "Somewhere I think you include the identification of key personnel within the organization who may be uniquely suited to help or hinder the project."

While these respondents seemed to retain the same views on knowledge management as those respondents who belonged to organizations where knowledge management was more evolved, their responses seemed to indicate that, as a whole, they were more willing to accept the proposed framework at face value. Based on their Delphi responses, these respondents seemed to generally agree that, in the absence of a corporate perspective of knowledge management, the current proposed framework was useful for

identifying issues over which they had control that could affect the selection and implementation of single knowledge management projects while also identifying larger organizational issues (over which they might not have control) that should be accounted for when selecting the appropriate knowledge management project for the organization.

"We find comfort among those who agree with us—growth among those who don't."

Frank A. Clark

Evaluating the Framework

There were a total of seven statements that were used to evaluate the overall framework. Two statements were used to assess the accuracy of the framework (3 and 6), three statements were used to assess the completeness and comprehensiveness of the framework (2, 4, and 5) and two statements were used to assess the usefulness of the framework (1 and 7). The seven statements are listed below in the order they were presented in both the Round One and Round Two surveys (Appendices C & G).

1. *It is important to have a framework identifying key decision variables that decision-makers should address when selecting a knowledge management (KM) project.* (Consensus achieved)

2. *This framework successfully captures the key decision-making processes that should occur when selecting and implementing a KM project.* (Consensus achieved)

3. *This framework accurately identifies the key decision-making processes that should occur when selecting and implementing a KM project.* (Consensus achieved)

4. *This framework successfully identifies the order in which the decision-making processes should occur when selecting and implementing a KM project.* (Consensus achieved)

5. *This framework successfully identifies the key decision variables to be considered when selecting a KM project.* (Consensus achieved)

6. *This framework accurately identifies the individual key decision variables for each key decision-making process.* (Consensus achieved)

7. *Utilizing this framework will ensure the selected KM project will have a higher probability of success when implemented than if this framework were not utilized.*

There were a total of three open-ended statements that were used to elicit inputs from the Delphi panel for changing, modifying, or refining the proposed framework. The three open-ended questions are listed below in the order they were presented in both the Round One and Round Two surveys (Appendices C & G).

1. *Are there any processes would you include or delete from this framework?*

2. *Are there any changes you would make to the order in which the decisions occur?*

3. *Are there any decision variables you feel are missing or are extraneous?*

Table 4.1 Consensus Ratings for Framework Evaluation Statements

	Statement		*Group Mean	Group Median	Range	*Std. Deviation	Consensus Achieved	Opinion Stability	
								% Change	Stability Achieved
1	It is important to have a framework identifying key decision variables that decision-makers should address when selecting a knowledge management (KM) project	Round 1	5	5	2	1			
		Round 2	5	5	2	1			
		Chg					YES	4%	YES
2	This framework successfully captures the key decision-making processes that should occur when selecting and implementing a KM project.	Round 1	4	4	2	1			
		Round 2	4	4	2	1			
		Chg					NO	0%	YES
3	This framework accurately identifies the key decision-making processes that should occur when selecting and implementing a KM project	Round 1	4	4	2	1			
		Round 2	4	4	2	1			
		Chg					NO	4%	YES
4	This framework successfully identifies the order in which the decision-making processes should occur when selecting and implementing a KM project	Round 1	4	4	3	1			
		Round 2	4	4	2	1			
		Chg					NO	4%	YES
5	This framework successfully identifies the key decision variables to be considered when selecting a KM project	Round 1	4	4	3	1			
		Round 2	4	4.5	2	1			
		Chg					YES	4%	YES
6	This framework accurately identifies the individual key decision variables for each key decision-making process	Round 1	4	4.5	2	1			
		Round 2	4	4	2	1			
		Chg					YES	0%	YES
7	Utilizing this framework will ensure the selected KM project will have a higher probability of success when implemented than if this framework were not utilized	Round 1	4	4	3	1			
		Round 2	4	4.5	3	1			
		Chg					NO	16%	NO

Scaled Responses listed in table refer to aggregate Delphi responses using a 6-item Likert Scale (1=strongly disagree to 6=strongly agree)

*Fractional values rounded to nearest whole number

Table 4.1 is a summarized view of the Delphi results from the first and second rounds, with Statements 1-7 in the table corresponding to the statements 1-7 listed above.

Appendix H provides a detailed analysis of the individual results by round, including any changes that occurred between rounds. There were only seven changes that occurred from Round One to Round Two, and they all had the effect of bringing the group closer to consensus, which is to be expected in a Delphi survey.

Statement 1 achieved a 100% consensus among Delphi members for both Round One and Round Two. This statement could have been removed after Round One because consensus (100%) had been achieved; however, it was felt that it was important to include the statement in Round Two because additional information was made available to all Delphi participants in the form of the aggregated responses to the open-ended question asking why it was important to have a framework. There was only one Delphi member who changed his/her response to Statement 1 from Round One to Round Two (moving from as scaled response of 4 to 5 on a scale of 1-6), but this change did not significantly change the overall consensus rating for Statement 1.

Statements 5 and 6 both achieved consensus ratings of 92% (11 out of 12) for Round Two. It should be noted that in Round One, both Statements 5 and 6 had two Delphi members that gave scaled responses of 3, which prevented these questions from achieving consensus in Round One (cumulative consensus for both questions in Round One was 86%). One of the Delphi members who participated in Round One, but did not participate in Round Two, had assigned scaled responses of 3 to Statements 5 and 6. Another of the Delphi members who participated in Round One, but did not participate in Round Two, had assigned scaled responses of 5 to Statements 5 and 6. There was no significant change in the scaled responses of Delphi members between Rounds One and Two, but the cumulative effect of the two individuals not participating in Round Two

resulted in both Statement 5 and Statement 6 achieving consensus in Round Two. This was because the consensus criteria applied to both rounds specified that, of the remaining 10%, no more than one (1) response can have a conflicting overall opinion than the group response [i.e., all group responses but one fall within the 1-3 range (generally disagree) or 4-6 range (generally agree)]. So, while it might be said that the result of two Delphi members with conflicting opinions (one agreeing with Statements 5 & 6 with scaled responses of 5 and on who slightly disagreed with Statements 5 & 6 with scaled responses of 3) not participating in Round Two should have no significant impact, the non-participation of both Delphi members did significantly impact to the overall consensus ratings for Statements 5 and 6 in Round Two. One point to note is that the Delphi participant who assigned scaled responses of 3 to Statements 5 and 6 also assigned scaled responses of 5 to Statements 1, 2, and 7 and assigned scaled responses of 4 to Statements 3 and 4, indicating that the Delphi member agreed with the overall framework, but felt that the organization of the key decision variables within the framework was, at times, confusing.

- Statement 5 comments—The framework is confusing. There are 5 sets of decision factors and really only 4 questions (albeit 5 tasks). I don't think they always correlate too well. Also, it mixes apples and oranges. ID & Map Tacit and Explicit Knowledge repositories (#5) is a whole new process or task...not a key decision making factor.

This was the only participant who responded that he/she felt the framework was confusing. Given the fact that this Delphi participant agreed with five of the seven framework evaluation questions (and was also the only participant to respond that the framework was confusing) could mitigate to some extent this Delphi member's non-participation in Round Two and the resulting impact that had on the overall consensus ratings for Statements 5 and 6. It is unclear whether his/her response to their Round One

rating would have changed in Round Two, given his/her general consensus of the framework (as identified in his/her Delphi ratings for framework evaluation statements 1-4 and 7).

What was somewhat unexpected was the stability that was achieved in the replies from Round One to Round Two. Replies from individual Delphi members changed very little between rounds, resulting in opinion stability being achieved on 56 of 59 survey statements in Round Two; of the three statements that did not achieve opinion stability in Round Two, two statements achieved consensus and the movement of rated responses toward consensus did not allow those items to achieve opinion stability. One respondent accounted for 43% of the changes from Round One to Round Two (Appendix H) but these were only minor adjustments, changing Round One scaled responses on statements 4, 5, and 7 from a 6 (highly agree) to a 5 (agree), bringing those individual replies closer to the final group mean and median for those statements. None of the changes that occurred from Round One to Round Two significantly affected the final results; of the fourteen respondents in Round One and the 12 respondents in Round Two, very few (4 of 12, or 33%) appeared to be swayed by the comments provided by the Round One respondents and none changed their Round Two responses more than one mark (on a scale of 1-6).

The one statement that did not achieve opinion stability was statement #7, which correlated use of the framework with a higher probability of success when implementing knowledge management projects.

- Framework Evaluation Statement#7--Utilizing this framework will ensure the selected knowledge management project will have a higher probability of success when implemented than if this framework were not utilized.

While there was a majority who felt that correlation was warranted (10 of 14 in Round One, or 71%; 8 of 12 in Round Two, or 67%: Appendix H), those who did not agree with the majority seemed reluctant to attribute eventual success of a knowledge management implementation project to any specific framework (based on their Delphi responses). The 4 Delphi participants that disagreed with statement 7 (all selected a 3 'slightly disagree', on a scale of 1-6) expressed in their replies that they felt that success was as likely the result of the attention generated on the knowledge management project selection & implementation process and the individuals implementing that process as it was a result of the utilization of this specific framework.

Statement #7 comments:

- "Any corporate decision made that is clearly and distinctly tied to the overall strategic objectives of the organization will have the highest degree of success. It will be defendable in competition for other corporate resources."
- "This is too broad of a statement, simply using this framework will not ensure such success...that would be more directly related to how this framework is interpreted and used in each individual case."
- Any focused attention on a group of important business and KM elements is going to add value to the decision process and therefore affect the probability of success. Does not indicate value of this specific model."

(Delphi member comments: Appendix G)

Their comments seem to reflect that they agree a framework is important, if for no other reason than to provide a mechanism for generating focus and attention on knowledge management. They identified other factors that could impact the eventual success of a knowledge management project to explain their caution of attributing success solely to the use of the proposed framework. Given their comments regarding this statement, it would seem that a more accurate reflection of the overall response of the Delphi group to Statement 7 would be that the proper framework is important to the eventual success of any knowledge management project, but a good framework is only as effective as the individuals using the framework. Given the Delphi group replies to this

statement, it's possible that a consensus might be achieved if the statement were worded to reflect that it would be better to use this framework than use no framework at all. Although there was a majority who supported Statement #7 and the level of disagreement indicated by those Delphi members who did not concur with Statement #7 (Appendix H) was relatively weak (slightly disagree), this supposition cannot be expressed with certainty because that specific statement was not posed to the Delphi group.

The three remaining framework evaluation statements that did not achieve consensus were Statements 2, 3, and 4. Statements 2 and 3 dealt with the identification of specific key decision-making processes (Statement 3) and the comprehensiveness and completeness of the identified key decision-making processes (Statement 2). Statement 4 dealt with the order in which the key decision-making processes were presented in the framework. The open-ended questions associated with Statements 2 and 4 produced a total of 12 of the 20 proposed framework modifications, of which 3 achieved consensus. While consensus was not reached on these three statements, there was a majority that agreed with each statement. When the Delphi responses to these three questions were analyzed based on organizational sub-populations within the overall Delphi group and looking at the distribution of responses across both rounds, there was evidence of a bi-modal response. Almost all of the Delphi members who agreed with Statements 2, 3, & 4 were Air Force members, while all of the Delphi members who disagreed with these same statements were members of DOD organizations other than the Air Force (see Table 4.2, next page). Each statement achieved opinion stability (Table 4.1 and Appendix H), indicating it was unlikely that any of the Delphi members would change their

responses, and if there was a change, it would be minor and not affect the final measure of consensus for each statement.

Table 4.2 Distribution of Delphi Responses for Framework Evaluation Statements 2, 3, & 4

Statement			Organization	
			Air Force	Other
2	This framework successfully captures the key decision-making processes that should occur when selecting and implementing a KM project	Round 1	8a	1a / 5d
		Round 2	7a	5d
3	This framework accurately identifies the key decision-making processes that should occur when selecting and implementing a KM project	Round 1	8a	2a / 4d
		Round 2	7a	1a / 4d
4	This framework successfully identifies the order in which the decision-making processes should occur when selecting and implementing a KM project	Round 1	8a	2a / 4d
		Round 2	7a	1a / 4d

#a = # that agree; #d = # that disagree (8a = 8 agree with statement 2)

This analysis provides evidence that a bi-modal response exists, as identified in the chapter summary above. When the Delphi committee sub-populations that generated the bi-modal response are analyzed, two key factors emerge that could explain the bi-modal response pattern. First, the Delphi members who disagreed with Statements 2, 3, & 4 belong to organizations that have more evolved levels of knowledge management integration; to include knowledge management visions strategies linking knowledge management to corporate strategic objectives and business plans, and enterprise-wide knowledge management initiatives and projects. Second, these Delphi members also have primary responsible for developing enterprise-wide corporate strategy, vision, and direction for knowledge management within their organization. Based on their responses to the Delphi survey questions, these individuals seemed more likely to view knowledge management from an organizational perspective and less from an individual practitioner's perspective, possibly due to the scope of their organizational responsibilities. Because their organizations are further along the evolutionary ladder with regards to

organizational knowledge management implementation, their knowledge management framework needs could differ from the framework requirements of organizations that are just beginning their knowledge management journey.

All of the Delphi members who agree with Statements 2, 3, & 4, with the exception of 2 in Round One and 1 in Round Two, were members of the Air Force; an organization that, with respect to the other DOD organizations represented in the Delphi committee, is just beginning its organizational knowledge management journey. Also, all of these same individuals are not as highly placed within their respective organizations, as were the previous Delphi members. This difference of organizational responsibilities and commensurate organizational perspective, (with one notable exception—the Air Force sponsor of this research effort), coupled with a differing framework requirement (or perception of a differing framework requirement) could explain the reason there was indication of a bi-modal response distribution for these three statements even though there was a consensus on a majority of the fifty-two statements used to identify key theoretical concepts that form the basis of the proposed framework (Appendices F & K).

Identifying Consensus on Key Theoretical Knowledge Management Concepts

This next section analyzed the aggregate Delphi responses to the 52 statements used to identify the key theoretical concepts that form the basis of the proposed framework. Each statement was linked to a corresponding section of the proposed framework and the reason for incorporating that key concept into the framework was covered in Chapter 2. This portion of Chapter 4 will not be used to analyze why the Delphi members achieved consensus on 37 of the 52 knowledge management theory statements, but rather will be devoted to analyzing the Delphi replies from both Round

One and Round Two, as well as the overall response patterns of the Delphi committee as a whole and sub-populations within the overall Delphi committee, to identify any factors that could explain why consensus was not reached on the remaining 15 of the 52 knowledge management theory statements. The 52 knowledge management theory statements are actually 26 statements that assessed two factors; the level of agreement the Delphi member had with the particular statement (signified by an "a" following the statement number), and how important the Delphi member felt the statement was to the construction of the proposed framework (signified by an "i" following the statement number). Both aspects of each statement were analyzed separately, so for the sake of consistency, the agreement aspect and the importance aspect of each of the 26 knowledge management theory statement will be considered as a separate statement, for a total of 52 knowledge management theory statement. Each statement will be identified at the beginning of the section in which it was analyzed. The 52 knowledge management theory statements were divided into four sections:

- Statements Regarding Decision Process Flow—statements 8a through 13i (12 statements total)
- Statements Regarding Identification of Key Decision Variables—statements 14a through 20i (14 statements total)
- Statements Regarding Success Factors for Project Variables—statements 21a through 27i (14 statements total)
- Statements Regarding Knowledge Management Theory—statements 28a through 33i (12 statements total)

Table 4.3 provides an consolidated view of the aggregate Round One and Round Two Delphi responses to the 15 knowledge management theory statements for which consensus was not achieved. Each question is referenced by the number in which it was presented in the Round One and Round Two surveys, followed by an "a" or an "i".

Table 4.3 Consensus Ratings for KM Theory Statements that did not Achieve Consensus in Rounds One or Two

	Statement		*Group Mean	Group Median	Range	*Std. Deviation	Consensus Achieved	Opinion Stability	
								% Change	Stability Achieved
8a	An organization should establish a corporate knowledge vision and knowledge strategy before an analysis of corporate strategic objectives (SWOT) can be performed.	Round 1	4	4	5	2			
		Round 2	4	4	5	2			
		Chg					NO	6%	YES
15a	The strategic goal of KM projects that reuse existing organizational knowledge (vs. creating new knowledge) is to streamline and enhance the organization's standard operating procedures and business methods by taking advantage of methods that have proven to be successful.	Round 1	4	4	5	2			
		Round 2	4	4.5	5	2			
		Chg					NO	0%	YES
15i		Round 1	4	4	5	2			
		Round 2	4	4.5	5	2			
		Chg					NO	0%	YES
16i	An organization's structure (flying wing vs. research lab, centralized vs. geographically separated), combined with the organization's knowledge strategy, should affect the selection and implementation strategy of a KM project.	Round 1	5	5	3	1			
		Round 2	4	4.5	2	1			
		Chg					NO	6%	YES
19a	KM projects designed to capture, codify, and utilize an organization's existing organizational knowledge should restructure employee compensation procedures to encourage and reward employee participation.	Round 1	4	4	4	2			
		Round 2	4	4	4	1			
		Chg					NO	13%	YES
19i		Round 1	4	4	5	2			
		Round 2	4	4	4	2			
		Chg					NO	13%	YES
20a	Organizational knowledge provides its greatest value to the organization when it is transferred from knowledge holders to knowledge users in a timely manner and with enough supplemental information (context) so that the existing knowledge can be applied to the knowledge user's current situation.	Round 1	5	5	4	1			
		Round 2	5	5	4	1			
		Chg					NO	6%	YES
20i		Round 1	5	5	3	1			
		Round 2	5	5	3	1			
		Chg					NO	6%	YES
22a	Tacit knowledge residing within organizational members loses much of its unique value when it is captured and stored in a organizational knowledge database because the knowledge loses its dynamic component and becomes static when stored.	Round 1	4	4	5	2			
		Round 2	4	4	5	2			
		Chg					NO	6%	YES
22i		Round 1	4	5	5	2			
		Round 2	4	4	5	2			
		Chg					NO	0%	YES
26i	Although a KM project can both reuse existing organizational knowledge and create new organizational knowledge, the project goals should clearly identify the overall focus of the KM project; reusing existing knowledge or creating new knowledge	Round 1	4	4	3	1			
		Round 2	4	4.5	3	1			
		Chg					NO	13%	YES
27a	Two common types of knowledge distribution strategies are push strategies and pull strategies. Of these two types, the pull strategy is the most effective method of providing the right knowledge to the right person at the	Round 1	4	4	5	2			
		Round 2	3	3.5	4	1			
		Chg					NO	13%	YES
28a	The greatest barrier to transferring Best Practices and Lessons Learned within an organization is the lack of absorptive capacity of the potential recipients of the knowledge	Round 1	3	2	3	1			
		Round 2	3	2	3	1			
		Chg					NO	6%	YES
28i		Round 1	3	4	5	2			
		Round 2	3	3.5	5	2			
		Chg					NO	13%	YES
29i	KM projects designed to capture and share an organization's best business practices/lessons learned add value to the organization by enabling users to make more informed business decisions and by incorporating these practices into the organization's standard operating procedures to make business processes more efficient	Round 1	5	5	4	1			
		Round 2	5	5	3	1			
		Chg					NO	13%	YES

Scaled Responses listed in table refer to aggregate Delphi responses using a 6-item Likert Scale (1=strongly disagree to 6=strongly agree)

*Values rounded to nearest whole number

All of the 15 knowledge management theory statements (100%) that did not achieve consensus did achieve opinion stability. In Table 4.3, Statements 15a, 15i, and 22i show that there was a change in the Group Mean from Round One to Round Two while the Opinion Stability measurements indicated that there was no change (0%) between rounds. This is not a discrepancy; there were twelve Delphi members who participated in Round One and only eight Delphi members who participated in Round Two. The Group Mean changed between rounds due to the decrease in participants (whose Round One ratings did not carry over to Round Two). The Opinion Stability measurements only looked for changes in response ratings for Delphi members who participated in both rounds (and there were no changes for these three statements between rounds).

Out of the 15 knowledge management theory statements that did not achieve consensus, a 75% majority was achieved in Round Two (6 respondents out of 8 total) on 7 out of 15 statements (Process Flow - 8a, Decision Variables - 15a, 15i, 20a, 20i, Success Factors - 26i, and General KM Theory - 29i) (Appendix K). A 63% majority (5 of 8) was also achieved three additional statements (Decision Variables - 16i, 19a, and 19i) Of the remaining five knowledge management theory statements, two statements (Success Factors - 22a and 22i) had a majority in Round One (58%, or 7 of 12) and no majority in Round Two (4 of 8 agree with Statements 22a and 22i and 4 of 8 disagree with these two statements). The remaining three knowledge management statements (Success Factors - 27a, General KM Theory - 28a & 28i) all had Group means and Group Medians that indicated a majority disagreed with these statements.

Further analysis revealed that Statement 28a (agreement - Greatest barrier to transferring Best Practices is lack of absorptive capacity) is the only statement that actually had a majority (83%, or 10 of 12 in Round One and 75%, or 6 of 8 in Round Two) who disagreed with the statement. Statement 28i (importance - Greatest barrier to transferring Best Practices is lack of absorptive capacity) had a Group Mean and Median that indicated overall disagreement (Table 4.3), but further analysis revealed that in Round One, 58 % of the Delphi members agreed with this statement and that 63% of the Delphi members who responded in Round Two agreed with this statement (*note: the sole reason for the increase in agreement percentage between Round One and Round Two is the decrease in the number of participants in Round Two*). Statement 27a (agreement - Pull strategy is most effective method of providing the right knowledge to the right person at the right time) also had a Group Mean and Median that indicated overall disagreement (Table 4.3), but further analysis revealed that the Delphi members who responded to this statement in Round One were equally split (50% agree / 50% disagree) and the same response pattern was represented in the responses for the Round Two Delphi participants. Table 4.4 summarizes the consensus ratings for those statements that did achieve consensus in Rounds One and Two.

Table 4.4 Statements Achieving Consensus in Either Round One or Two

	STATEMENT	*Group Mean	*Group Median	*Standard Deviation
8i	An organization should establish a corporate knowledge vision and knowledge strategy before an analysis of corporate strategic objectives can be performed	5	6	1
9a	The first process in selecting a KM project should be an analysis of corporate strategic goals to make a determination whether KM can provide the organization with a strategic advantage	5	5	2
9i		5	5	2
10a	Active, visible sponsorship by senior leadership needs to begin at the very first step of the KM evaluation and project selection process and continue through each step of the proposed KM project decision selection framework	6	6	1
10i		6	6	0
11a	The organization's organizational structure and management philosophy are critical factors that must be addressed early in the KM project selection process because they can affect decisions made during each step of the process	5	5	1
11i		5	5	1
12a	Prior to identifying KM project variables affecting project implementation success, definitions of key terms should be agreed upon in advance so that everyone has a clear understanding of the KM project's intended purpose	5	5	1
12i		5	5	1
13a	An organization's corporate knowledge vision and knowledge strategy are the primary guidance for identification, development, and implementation of all KM projects undertaken throughout the organization to ensure each KM project's goals are consistent with organizational objectives	5	5	2
13i		5	5	1
14a	To achieve the greatest measure of success across the entire organization, potential KM projects should focus on a key business process within the organization that directly supports the organization's strategic vision and goals	5	5	2
14i		6	6	1
16a	An organization's structure (flying wing vs. research lab, centralized vs. geographically separated), combined with the organization's knowledge strategy, should affect the selection and implementation strategy of a KM project	4	5	1
17a	When identifying potential KM efforts, it is important to identify the potential impact the organization's culture will have on the acceptance and utilization of the KM project and how that will impact the successful implementation of the project	6	6	1
17i		6	6	1
18a	Part of identifying potential knowledge management efforts should include the development of clearly defined goals and measures of success that are directly tied to or support the organization's overall strategic vision and objectives	5	5	1
18i		6	6	1
21a	A military organization's tacit organizational knowledge, residing primarily within informal communities of practice, forms the core of that organization's distinctive competence	5	5	1
21i		5	5	1
23a	For organizations to effectively transfer and utilize organizational best practices and lessons learned, both the explicit and the tacit knowledge associated with the best practice/lesson learned must be identified and transferred or made available to potential users	5	5	1
23i		5	5	1
24a	The most effective way to transfer the context (tacit knowledge) underlying organizational processes that create and sustain organizational knowledge is through the use of communities of practice and knowledge pointers to tacit knowledge repositories	5	4	1
24i		5	5	1
25a	Knowledge management projects designed to capture and codify organizational knowledge must have procedures in place to ensure the captured knowledge remains current and correctly reflects the organization's strategic goals and direction	5	6	2
25i		5	5	1
26a	Although a KM project can both reuse existing organizational knowledge and create new organizational knowledge, the project goals should clearly identify the overall focus of the KM project; reusing existing knowledge or creating new knowledge	5	5	1

Scaled Responses listed in table refer to aggregate Delphi responses using a 6-item Likert Scale (1=strongly disagree to 6=strongly agree) *Values rounded to nearest whole number

Table 4.4 cont. Statements Achieving Consensus in Either Round One or Two

	STATEMENT	*Group Mean	*Group Median	*Standard Deviation
27i	Two common types of knowledge distribution strategies are push strategies and pull strategies. Of these two types, the pull strategy is the most effective method of providing the right knowledge to the right person at the right time	4	4	1
29a	KM projects designed to capture and share an organization's best business practices/lessons learned add value to the organization by enabling users to make more informed business decisions and by incorporating these practices into the organization's standard operating procedures to make business processes more efficient	5	5	1
30a	KM projects designed to create new organizational knowledge add value to the organization by fostering inter-organizational collaboration and transfer of tacit knowledge, diffusing the organization's tacit knowledge throughout the organization	5	5	1
30i		5	5	1
31a	Organizations that see knowledge as a physical resource to be captured and managed instead of a dynamic process based upon human cognitive abilities will not achieve the full potential business advantages that are possible with knowledge management	5	6	1
31i		5	5	2
32a	The primary focus of knowledge management is to enable the organization to share organizational knowledge throughout the organization for the purpose of making more informed decisions that will complement the organization's strategic goals	5	6	1
32i		6	6	1
33a	Knowledge management is not really about managing knowledge as a physical resource; rather it is about managing access to and utilization of existing organizational knowledge that resides within the organization to achieve the organizations strategic goals	5	5	1
33i		6	6	1

Scaled Responses listed in table refer to aggregate Delphi responses using a 6-item Likert Scale (1=strongly disagree to 6=strongly agree) *Values rounded to nearest whole number

Decision Process Flow

8. *An organization should establish a corporate knowledge vision and knowledge strategy before an analysis of corporate strategic objectives (SWOT – strengths, weaknesses, opportunities, threats) can be performed.* (8a & 8i) (Consensus – 8i)
9. *The first process in selecting a KM project should be an analysis of corporate strategic goals to make a determination whether KM can provide the organization with a strategic advantage.* (9a & 9i) (Consensus – 9a & 9i)
10. *Active, visible sponsorship by senior leadership needs to begin at the very first step of the KM evaluation and project selection process and continue through each step of the proposed KM project decision selection framework.* (10a & 10i) (Consensus – 10a & 10i)
11. *The organization's organizational structure and management philosophy are critical factors that must be addressed early in the KM project selection process because they can affect decisions made during each step of the process.* (11a & 11i) (Consensus – 11a & 11i)
12. *Prior to identifying KM project variables affecting project implementation success, definitions of key terms should be agreed upon in advance so that everyone has a*

clear understanding of the KM project's intended purpose. (12a & 12i) (Consensus – 12a & 12i)

13. *An organization's corporate knowledge vision and knowledge strategy are the primary guidance for identification, development, and implementation of all KM projects undertaken throughout the organization to ensure each KM project's goals are consistent with organizational objectives.* (13a & 13i) (Consensus – 13a & 13i)

Eleven of the twelve statements regarding Decision Process Flow (8a through 13i) achieved consensus; six achieved consensus in Round One (9a, 9i, 10a, 10i, 11a, 11i: Appendix F) and five achieved consensus in Round Two (8i, 12a, 12i, 13a, 13i: Appendix K). The only Statement in this section that did not achieve consensus was Statement 8a. While there was a majority that agreed with this statement (75% in Round Two, or 6 of 8), the two Delphi members who did disagree, disagreed strongly, providing scaled responses of 1 (on a scale of 1-6) in both Round One and Round Two. Both of these individuals were Air Force members who had different levels and scopes of responsibility. Further analysis of the Delphi comments specifically addressed to Statement 8a and the general section comments that addressed Statement 8a (Appendix J) seem to explain some of the reluctance of Delphi members to agree with this statement.

Specific comments regarding Statement 8a:

- A SWOT can be done anytime anywhere, across the entire organization or at department level. Objectives and strategies are developed as a result of the SWOT analysis, which show the gaps between where you are and where you want to be. To develop strategies before this may lead to wrong strategies.
- Corporate strategic objectives flow from the corporate mission and vision. One method of developing the strategic objectives is SWOT analysis. The corporate knowledge vision and strategy flow from the corporate strategic plan, not the other way around.

General comments regarding Statement 8a:

- A new KM effort may fundamentally change the vision of the organization -- grounding your KM efforts in the existing vision may limit your future efforts and directions
- Most organizations we have dealt with have not developed a km strategy. In fact, the degree of success of the pilot may be what actually makes the organization develop such a strategy.
- The organization's corporate K vision and strategy are critical success factors.
- The organization's corporate/enterprise vision and strategy are critical to any effort undertaken, and occurs outside of the KM framework; there should be no separate "knowledge vision" or "knowledge strategy."

There are two approaches that can be taken with regards to a knowledge management vision and strategy and a corporate strategic SWOT analysis. If the corporate knowledge vision and strategy is directly tied to the corporate strategic vision and plan and is used to help focus the company's strategic efforts in achieving the overall corporate strategy (it is a subset of the overall strategic plan), then the corporate knowledge vision and strategy should be developed before a SWOT analysis is performed. In this instance, the corporate strategic objectives are defined in some part by the corporate knowledge vision and strategy (as a component of the corporation's overall corporate strategy); therefore, the corporate strategic objectives cannot be developed until all of the corporation's strategic plans have been established, from which would flow the analysis of those strategic objectives (SWOT).

However, if the corporation's knowledge vision and strategy are viewed as a business strategy that was developed to help achieve the organization's strategic objectives, then the SWOT analysis of corporate strategic objectives should occur first. In this instance, the SWOT analysis would identify specific corporate objectives that would be incorporated into the organization's knowledge vision and strategy.

Three of the five Delphi members who are CKOs (or equivalent) participated in the knowledge management theory section of Round One and assigned scaled responses of 5 (1 member) and 6 (2 members) to Statement 8a. The two CKOs who participated in the knowledge management theory portion of Round Two as well maintained their scaled response answers of 6 (Strongly Agree). There was not any clear response pattern in the rest of the Delphi participants, but typically their scope of responsibilities regarding knowledge management within their respective organizations would not be as large as

those of the CKOs who participated in the Delphi study. A correlation could be drawn that the Delphi response to Statement 8a is predicated on the perception the participant has as to how knowledge management should be utilized within the organization. While there is evidence of a correlation between these two factors, there is not enough information available to establish a causal link between these two observations.

If the belief is that knowledge management is an extension of a corporation's overall strategy, from which flow corporate strategic objectives that are then tied into specific business plans, then a knowledge management vision and strategy needs to be established before a corporate strategic plan and associated strategic objectives are developed. If they are not established prior to the strategic plan, then the strategic plan might not incorporate the strategic advantages offered by knowledge management. If the belief is that a knowledge management vision and strategy is something that is developed to help execute the strategic plan and achieve the corporation's strategic objectives, then it should occur after the corporation's strategic objectives are formed. There is no one right answer to Statement 8a, but it would seem that if one views knowledge as a core asset of the organization and knowledge management as the method by which to achieve strategic advantage of that asset, then knowledge management should be an integral part of the corporation's overall vision and strategy, from which would flow the organization's strategic plan and objectives.

Identification of Key Decision Variables

14. *To achieve the greatest measure of success across the entire organization, potential KM projects should focus on a key business process within the organization that directly supports the organization's strategic vision and goals.* (14a & 14i) (Consensus – 14a & 14i)
15. *The strategic goal of KM projects that reuse existing organizational knowledge (vs. creating new knowledge) is to streamline and enhance the organization's standard*

operating procedures and business methods by taking advantage of methods that have proven to be successful. (15a & 15i)

16. *An organization's structure (flying wing vs. research lab, centralized vs. geographically separated), combined with the organization's knowledge strategy, should affect the selection and implementation strategy of a KM project.* (16a & 16i) (Consensus – 16a)
17. *When identifying potential KM efforts, it is important to identify the potential impact the organization's culture will have on the acceptance and utilization of the KM project and how that impact will affect the successful implementation of the KM project.* (17a & 17i) (Consensus – 17a & 17i)
18. *Part of identifying potential knowledge management efforts should include the development of clearly defined goals and measures of success that are directly tied to or support the organization's overall strategic vision and objectives.* (18a & 18i) (Consensus – 18a & 18i)
19. *KM projects designed to capture, codify, and utilize an organization's existing organizational knowledge should restructure employee compensation procedures to encourage and reward employee participation.* (19a & 19i)
20. *Organizational knowledge provides its greatest value to the organization when it is transferred from knowledge holders to knowledge users in a timely manner and with enough supplemental information (context) so that the existing knowledge can be applied to the knowledge user's current situation.* (20a & 20i)

Seven of the fourteen statements regarding Identification of Key Decision Variables achieved consensus: six achieved consensus in Round One (14a, 14i, 17a, 17i, 18a, 18i: Appendix F) and one achieved consensus in Round Two (16a: Appendix K). There were seven statements that did not achieve consensus in either round, more than any other section of the knowledge management theory portion of the survey (15a, 15i, 16i, 19a, 19i, 20a, 20i: Appendix K).

Statements 15a and 15i both achieved a 75% majority in Round Two but there was no clear response pattern that would indicate why consensus was not achieved; scaled responses from Delphi members ranged from a 1 to a 6 and no pattern was evident within the Delphi group responses. From the specific Delphi comments to these statements, it would seem that while there is agreement on the direction of the statement, there is disagreement with how it is structured or worded.

Specific comments concerning Statements 15a & 15i:

- The goal of the KM project might more appropriately be to share the knowledge generated by a perfectly well run business process.
- I am not sure this question is worded properly, the last phrase of it is far too bold of a leap. The strategic goal of any KM project should be an attempt to enable faster, better informed decisions.

Statement 16i dealt with the effect an organization's structure should have on knowledge management project selection and implementation and whether this should be incorporated into the framework. This statement achieved a 63% majority in Round Two (5 of 8), with each of the three Delphi respondents who disagreed assigning scaled responses of 3 (slightly disagree) (Appendix K). There was consensus that an organization's structure is an important consideration when selecting and implementing a knowledge management project, as evidenced by the consensus achieved in Round Two for Statement 16a. Given that there was consensus on Statement 16a and there were a majority of Delphi responses that indicated it should be included in the framework, it would seem appropriate to leave it as a part of the framework.

Existing literature (as identified in Chapter 2) indicates that there is no one right way to incorporate organizational structure into a knowledge management project; requirements are predicated on the needs of the organization and how it plans to utilized its organizational knowledge. The type of project and organization, as well as the formal organizational structure, will dictate the importance organizational structure plays in the knowledge management selection process. The generic and specific Delphi inputs regarding Statements 16a & 16i, shown below and in Appendix J, could provide some guidance for future framework users to determine how to factor organizational structure into their knowledge management selection and implementation process.

Specific Delphi group comments on Statement 16a & 16i:

- See previous comments regarding importance of organizational structure. Strategy is important to the selection. Organizational structure is primarily important to implementation.
- Organizational structure is important for cultural considerations; but strategic goals & objectives should be the primary driving factor in designing a system. Organization structure is "a" consideration, not "the" consideration. Perhaps a better way to describe this is that organizational structure may determine the "how," whereas strategic goals and objectives should determine the "what & why."

General Delphi comments related to Statements 16a & 16i:

- Organizational structure and geographic location are less important than the type of work being done by the individual. Since all workers are knowledge workers in some (if not all) of their roles, all have the potential to benefit from a flexible KM infrastructure.
- Often organizational structure has to be changed due to reengineered business processes. It is about paradigm shift.

Statements 19a & 19i dealt with restructuring employee compensation procedures to encourage employee participation. Each of these statements received a 63% majority in Round Two (5 of 8), but there was no clear response pattern that would indicate why consensus was not achieved; scaled responses from Delphi members ranged from a 2 to a 6 and no pattern was evident within the Delphi group responses. The intent of these two statements was to gain consensus that it was important to identify to employees what type of productivity was important to the organization, develop methods to encourage these desired types of productivity, incorporate them into the organization's performance evaluation standards, and ultimately institutionalize knowledge management participation into the organizational culture.

From the general and specific Delphi member comments regarding statements 19a & 19i, many Delphi members seemed to equate employee compensation with paying people to participate. There were some members who looked past monetary rewards and saw the need to restructure compensation procedures to not only reward desired forms of participation, but to also identify desired participation behavior as a part of the formal and informal employee performance standards. Chapter Two clearly indicates when

knowledge management projects are implemented, there needs to be a concerted effort by senior management to encourage utilization of the knowledge management project and encourage the development of employee behaviors that support the tenets of knowledge management. Below are Delphi members comments pertaining to Statements 19a & 19i.

Specific Delphi comments related to Statements 19a & 19i:

- While it is important, or critical, to the project's success to answer the customer's "What's in it for me?" question, the answer does not necessarily need to be more money in my pocket. Just making life easier for the customer, or providing more personal recognition, may be sufficient.
- If we are talking about trying to influence collaboration by directly paying for it, I would rate this a "3"; however, if we are talking about the bigger picture of incorporating this into performance standards and reviews, thus ultimately affecting the promotion and bonus process, I would consider this to be a "6."

General Delphi comments related to Statements 19a & 19i:

- Organizational culture will evolve with the right incentives -- which may be intangible compensation (e.g., recognition), versus financial -- and with the passage of time, as those who don't adapt elect to depart.

Statements 20a & 20i dealt with how organizational knowledge provides its greatest value to the organization. Each of these statements received an 83% majority in Round One (10 of 12) and a 75% majority in Round Two (6 of 8). The two Delphi members who disagreed with these statements assigned scaled responses of 2s and 3s (respectively) to Statement 20a for both rounds and scaled responses of 3s to Statement 20i for both rounds. Conversely, in Round One the Delphi members assigned scaled responses ranging from a total of one 4 to six 6s for Statement 20a in and two 4s to five 6s for Statement 20i. Even though four fewer Delphi members participated in Round Two, there were a total of three 6s and three 5s assigned to Statement 20a and three 6s, two 5s, and one 4 assigned to Statement 20i. Given the strength with which the Delphi members who agreed with these statements expressed their opinions in both rounds (6=strongly agree) when compared to the two Delphi members who disagreed, it would seem prudent to keep these statements incorporated into the framework. There were no

generic comments and only one specific comment regarding Statements 20a and 20i; this comment can be found in Appendix K.

Success Factors for Project Variables

21. *A military organization's tacit organizational knowledge, residing primarily within informal communities of practice, forms the core of that organization's distinctive competence.* (21a & 21i) (Consensus – 21a & 21i)
22. *Tacit knowledge residing within organizational members loses much of its unique value when it is captured and stored in a organizational knowledge database because the knowledge loses its dynamic component and becomes static when stored.* (22a & 22i)
23. *For organizations to effectively transfer and utilize organizational best practices and lessons learned, both the explicit and the tacit knowledge associated with the best practice/lesson learned must be identified and transferred or made available to potential users.* (23a & 23i) (Consensus – 23a & 23i)
24. *The most effective way to transfer the context (tacit knowledge) underlying organizational processes that create and sustain organizational knowledge is through the use of communities of practice and knowledge pointers to tacit knowledge repositories.* (24a & 24i) (Consensus – 24a & 24i)
25. *Knowledge management projects designed to capture and codify organizational knowledge must have procedures in place to ensure the captured knowledge remains current and correctly reflects the organization's strategic goals and direction.* (25a & 25i) (Consensus – 25a & 25i)
26. *Although a KM project can both reuse existing organizational knowledge and create new organizational knowledge, the project goals should clearly identify the overall focus of the KM project; reusing existing knowledge or creating new knowledge.* (26a & 26i) (Consensus – 26a)
27. *Two common types of knowledge distribution strategies are push strategies and pull strategies. Of these two types, the pull strategy is the most effective method of providing the right knowledge to the right person at the right time.* (27a & 27i) (Consensus – 27i)

Ten of the fourteen statements regarding Success Factors for Project Variables achieved consensus: five achieved consensus in Round One (23a, 23i, 24a, 24i, 25a: Appendix F) and five achieved consensus in Round Two (21a, 21i, 25i, 26a, 27i: Appendix K). There were four statements that did not achieve consensus in either round: (22a, 22i, 26i, 27a: Appendix K).

Statements 22a & 22i dealt with how the value of tacit knowledge is tied to the dynamic component of the knowledge and when that knowledge is captured and stored, some of that value is lost. There was not a majority within the Delphi participants of either round who agreed with these statements. In Round Two, the final result was that 50% of the Delphi respondents agreed with both statements and 50% disagreed. There was no pattern of response between each round or with sub-populations within the Delphi committee to explain this result. Scaled responses of those Delphi members who agreed with both statements ranged from 6 to 5 and scaled responses for those who disagreed with both statements ranged from a low of 1 to 3. Based on the specific Delphi comments related to these statements and general Delphi comments that addressed this factor as well, it seemed as though those Delphi members who disagreed with both Statements felt that if the tacit knowledge was captured and stored properly, it would still retain its value to the organization.

Chapter Two supports the theory underlying Statement 22; that tacit knowledge is, of itself, inherent to the individual or community in which that tacit knowledge resides and that the act of capturing this knowledge transforms it into explicit knowledge, which is inherently more static than tacit knowledge. The level to which the dynamic component of tacit knowledge is lost when it is made explicit is open for debate and currently is being debated in both academic and professional circles. There currently seems to be no correct response to this statement. Some of the specific and general Delphi comments related to these statements might shed light on this subject area, but the cumulative responses from the Delphi members did not provide a clear direction for this subject. Until more is known about the true nature of tacit knowledge and how to best

transfer and utilize that knowledge, future framework users are left to make their own judgment calls. Based on the Delphi responses from the sponsors of this research, it seemed appropriate to keep these statements incorporated into the framework. The fact that there is no clear consensus on these issues would seem to indicate that it is an area that should be taken into account when selecting and implementing a knowledge management project. It is important to know the philosophy to which the potential customers and users of the knowledge management project prescribe.

General & specific Delphi comments regarding Statements 22a & 22i:

- Only to the degree that the knowledge itself is dynamic or fleeting. The value of knowledge is determined by the critical nature of the question it is used to answer and not on whether or not it's written down.
- If done properly, this is not an accurate statement. A big current shortfall is the lack of effective planning to leverage lessons learned/proven practices... much could be effectively be captured; but, how we plan to use it is the challenge.
- "Making tacit knowledge available" includes providing opportunities for individuals to communicate across geographic, time, and organizational boundaries with other individuals they may not even know exist. (See comment in Key Decision Variables Section about the need for a flexible KM infrastructure.)
- Most of valuable knowledge is tacit knowledge; tacit knowledge is up-to-date knowledge.

Statement 26a dealt with the need to identify whether the overall focus of a knowledge management project is to create new knowledge or reutilize existing knowledge. Although a consensus was not achieved, six of the eight Delphi members who participated in Round Two agreed with this statement (75%). Scaled responses of those Delphi members who agreed with this statement ranged from a high of 6 down to 4 and the two Delphi members who disagreed with this statement both assigned scaled responses of 3. The only response pattern that was identified was that three of the four Delphi members who disagreed in Round One and the two Delphi members who disagreed in Round Two were all Air Force members. There was no clear direction that

developed out of the analyzed Delphi responses for either Round One or Round Two, so as was the case with some of the previous statements that did not achieve consensus, it is left to the judgment of future framework users to provide the proper weight to this success factor when selecting and implementing a knowledge management project. Based on current research in this area (detailed in Chapter Two) and the lack of a majority of Delphi respondents who disagreed with incorporated these statements into the overall framework, a case could be made that these statements should be used when developing success factors for knowledge management project variables.

Statement 27a deals with knowledge distribution strategies and specifies that a pull strategy is the most effective method of delivering the right knowledge to the right person at the right time. As with Statements 22a & 22i, there was no clear majority of Delphi participants that either agreed or disagreed with this statement, in both rounds opinions were split down the middle, 50% agreed and 50% disagreed. While there was no clear explanation indicated in the Delphi response patterns between rounds, there was some indication of a pattern within rounds. This pattern seemed to be predicated on the scope of the responsibilities of the Delphi respondent and seemed to indicate a correlation between where the participant was placed within the organization and their response to this statement.

For instance, five of the six Round One Delphi participants who agreed (scaled responses of 4-6) with this statement were, within their own organization, responsible for the development and oversight of enterprise-wide corporate policy, direction, and for some, strategic planning and vision of knowledge management and knowledge management initiatives. This statement also holds true for three of the four Round Two

Delphi participants who agreed with Statement 27a. For the six Round One and four Round Two Delphi participants who disagreed with Statement 27a, none seemed to have the same level of enterprise-wide oversight and developmental responsibilities as did those who agreed with this statement. This correlation was observed, but there was no specific demographic information upon which to base this observation other than rank, position, and organizational responsibilities as indicated in the Delphi Member Contact Sheet (Appendix B). Discussions with numerous Delphi members indicated that individuals in senior leadership positions would rather have the flexibility of procuring their own knowledge while those at lower levels within the organization are concerned that they may not be aware of important knowledge and therefore, rely on someone in an oversight position to funnel important organizational knowledge to them while still retaining the capability of procuring their own knowledge when it is warranted or desired.

Given this observation, a comment from one of the Delphi members provides a direction that may be considered appropriate for future framework implementers; "you need flexibility in your architecture for both".

Specific Delphi comments regarding Statement 27a:

- You need the flexibility in your architecture for both. If I know what I need, it's certainly more effective for me to pull what I need, and only what I need, when I need it, and in the form I need it. But if I know you need something but you don't know you need it, I need to be able to push it to you. Bottom line: You need both push and pull. And while we're on the subject of delivery, you also need to aggregate or collect knowledge objects relating to a project or a work-group. This would be analogous to the old office bookcase and work table.
- Today, this is an accurate statement; however, the technology necessary to push content in context is getting much better. The mark on the wall should be customization to every organization & individual, providing content in context; until we do this, KM systems are still in their infancy.

Given that Statement 27a is not explicitly expressed in the framework, but instead provides underlying support for both Identifying KM Project Variables and Success

Factors Affecting Project Implementation and Success and the fact that there was a clear consensus that this statement was important to the framework, it can be recommended that this statement should remain a part of the framework, with the potential modification of ensuring there is flexibility in your KM architecture for both strategies.

Knowledge Management Theory

28. *The greatest barrier to transferring Best Practices and Lessons Learned within an organization is the lack of absorptive capacity of the potential recipients of the knowledge.* (28a & 28i)
29. *KM projects designed to capture and share an organization's best business practices/lessons learned add value to the organization by enabling users to make more informed business decisions and by incorporating these practices into the organization's standard operating procedures to make business processes more efficient.* (29a & 29i) (Consensus – 29a)
30. *KM projects designed to create new organizational knowledge add value to the organization by fostering inter-organizational collaboration and transfer of tacit knowledge, diffusing the organization's tacit knowledge throughout the organization.* (30a & 30i) (Consensus – 30a & 30i)
31. *Organizations that see knowledge as a physical resource to be captured and managed instead of a dynamic process based upon human cognitive abilities will not achieve the full potential business advantages that are possible with knowledge management.* (31a & 31i) (Consensus – 31a & 31i)
32. *The primary focus of knowledge management is to enable the organization to share organizational knowledge throughout the organization for the purpose of making more informed decisions that will complement the organization's strategic goals.* (32a & 32i) (Consensus – 32a & 32i)
33. *Knowledge management is not really about managing knowledge as a physical resource; rather it is about managing access to and utilization of existing organizational knowledge that resides within the organization to achieve the organizations strategic goals.* (33a & 33i) (Consensus – 33a & 33i)

Nine of the Twelve statements regarding Knowledge Management Theory achieved consensus: six achieved consensus in Round One (30i, 31a, 32a, 32i, 33a, 33i: Appendix F) and three achieved consensus in Round Two (29a, 30a, 31i: Appendix K). There were three statements that did not achieve consensus in either round: (28a, 28i, 29i: Appendix K).

Statements 28a & 28i both dealt with the greatest barrier to transferring Best Practices and Lessons Learned within an organization. These statements were the most contentious of all the 52 knowledge management theory statements and seven framework evaluation statements presented to the Delphi group. Statement 28a was the only statement in the survey to which a clear majority of Delphi members disagreed. In Round One, 9 of 12 Delphi participants (75%) disagreed and in Round Two, 6 of 8 Delphi participants (75%) disagreed with this statement. Statement 28i fared a little better, with 58% of the Delphi participants (7 f 12) in Round One agreeing that, while they did not agree with the statement, they felt the issue was important enough to be incorporated into the framework. The overall percentage fell in Round Two, with 4 of 8 participants (50%) agreeing that the issue should be included in the framework and an equal number of participants (4 of 8 or 50%) disagreeing that the issue should be incorporated into the framework.

Part of the reason for the levels of disagreement with these statements seemed to be that what was proposed was viewed in a negative light and possibly was considered disparaging to some employees (see specific Delphi comments below).

- Greatest barrier is an individual's reluctance to share their prized knowledge. Knowledge is power, self -promotional, I worked for my knowledge and you should work just as hard to gain the same knowledge etc.
- One of the barriers is the culture
- Greatest barrier is the lack of an effective process to leverage lessons learned/proven practices. Ford is a great example of a way to do this right, if you are looking for positive examples.
- So you're saying the biggest barrier to effectively using knowledge is the intellectual limitations of our personnel. I certainly don't want to propose that anywhere.

Another possible reason is that there is a common belief within the business community, and expressed through numerous surveys of business executives, that the greatest barriers

to knowledge transfer are cultural and behavioral (O'Dell & Grayson, 2000; Szulansi, 1996).

During the course of this research, several articles concerning the transfer of Best Practices and Lessons Learned were identified and referenced that used a relatively unknown term: "absorptive capacity". Absorptive capacity is defined as the ability of a knowledge recipient to evaluate, assimilate, and apply new knowledge successfully to a particular situations (Cohen & Levinthal, 1990). The intent of Statement 28 was to say that each person has limits on the amount of information they can efficiently evaluate, assimilate, and apply (i.e.. convert inf. into knowledge). This concept would impact how information is captured, categorized, stored, and presented to limit overload and maximize utilization (capture context, pull vs. push, repositories vs. COPs & pointers), directly affecting the selection and successful implementation of any knowledge management project.

While the term "absorptive capacity" is not commonly known, there is a common basis of opinion that an individual's ability to absorb new information directly affects his/her ability to convert that information into knowledge that can be applied by the individual (Cohen & Levinthal, 1990; Hackbarth and Grover, 1999). A common example is the use of analogies and metaphors to promote the transfer of information from one person to the next. This concept is used to provide information to the recipient in a form that is understandable to them, thereby enhancing the probability that the information will be absorbed and comprehended by the recipient so that they may apply it. In teaching, the ability to transfer knowledge to a student so that they can then apply that knowledge, described as cognitive learning in Bloom's Taxonomy of Learning, is considered the

highest level of learning and is normally measured through projects and essays that require the individual to apply what they have learned to a new problem or task using an unstructured format (i.e. without the benefit of a checklist specifying what must be done and the order in which it is done) (Rice & Luby, 1985; Rice & Taylor, 1992).

During a study analyzing 122 Best Practice transfers in eight companies, Gabriel Szulanski found that one of the three most important barriers to the transfer of Best Practices within an organization was "absorptive capacity", the other two being causal ambiguity and an arduous relationship between the source and the recipient (Szulanski, 1996). Based on Szulanski's findings and Cohen & Levinthal's research, substantiated by O'Dell & Grayson's findings, that stress the need to find methods that allow users to absorb knowledge easier and quicker, increasing the effectiveness of knowledge transfer and comprehension of that transferred knowledge is an important component of the transfer of organizational Best Practices & Lessons Learned (Hackbarth & Grover, King, 1999, Lia & Chu, 2000; Rice & Taylor; 1992). Based on research conducted as part if the Literature review, it can be suggested that the basic theory underlying Statement 28 is accurate and that Statement 28 should remain incorporated into the framework. However, it would seem (from the Delphi results) that Statement 28 should be revised to provide a clearer understanding of what "absorptive capacity" is, how it impacts the acquisition and application of new knowledge, and the potential impact on future knowledge management projects, especially those whose purpose is the transfer of an organization's Best Practices and Lessons Learned.

The last Statement to be covered is Statement 29i, which deals with how knowledge management projects designed to capture and share organizational best

practices and lessons learned add value to the organization. Statement 29a achieved consensus in Round One, meaning that all but one of the Delphi participants agreed with Statement 29a; however, only 75% (9 of 12) of those same Delphi participants felt it should be incorporated into the framework (Statement 29i). In Round One, Delphi participants who agreed with Statement 29i assigned the following scaled responses: four 6s and five 5s. In Round Two, this statement again failed to achieve a consensus, with 75% (6 of 8) participants agreeing that it should be included in the framework. These participants assigned scaled responses of three 6s, two 5s and one 4 to Statement 29i, while the two Round Two Delphi participants who disagreed both provided scaled responses of 3. Given the strength with which the Delphi members who agreed with this statement expressed their opinions in both rounds (6=strongly agree) when compared to the two Delphi members who disagreed (3=slightly disagree), it would seem appropriate to keep this statement incorporated into the framework.

Modifications to the Proposed Framework

There were three open-ended questions in Round One that were intended to solicit inputs from Delphi members identifying weaknesses or shortfalls in the proposed framework design. These inputs were to be used to identify potential modifications to the proposed framework. There were twenty possible modifications to the existing framework that were identified by the fourteen Delphi participants of Round One. These twenty proposed modifications were included in Round Two as part of the Framework Evaluation section of the survey. There were twelve Delphi members who responded to the Round Two Framework Evaluation statements, but only six Delphi members responded to the twenty statements identifying proposed modifications to the framework.

It is unclear what precipitated the drop in participation for this portion of the survey. It is possible the survey instructions were unclear or that Delphi participants were constricted in the time they had available to respond to the entire survey. There was also a noticeable reduction in participation for the knowledge management theory section of Round Two and these decreased response rates for Round Two in these two areas could indicate that the Delphi members, due to their daily functional responsibilities, were unable to find the time to respond to every statement. Discussions with some Delphi members identified a concern that the survey process was more time-consuming than they had previously expected and this could account for a decreased response to the portions of the survey that did not directly deal with evaluation of the initial proposed framework. It is also possible that comments from some Delphi members were mis-identified as proposed modifications and that the Delphi member actually intended that the individual response only be considered a specific comment to the framework and not an actual modification proposal.

Due to the decreased response rate, the only way a modification proposal could achieve consensus is if there was unanimous support for (or against) the specific proposal (agreement by 90% of respondents is required for consensus). There were twenty proposed modifications and of those twenty, there were six that received consensus (see Table 4.5). Appendix K identifies the individual responses of each Delphi member who replied to the "evaluation of framework modifications proposed in Round One" section of the Round Two survey (Appendix G). While there was a consensus on six of the twenty proposed modifications, there is some doubt whether consensus on these six items reflects a consensus on these same items by the overall groups. Due to the low level of

participation for this portion of the framework and the lack of a clear consensus of a majority of the Delphi group it was decided that none of the modifications would be incorporated into the framework as part of this research effort. It will be recommended that additional research be conducted to validate the proposed modifications and identify a consensus of opinion using a full Delphi survey.

Table 4.5 Consensus Ratings for Proposed Framework Modifications

QUESTION		PROPOSED MODIFICATION	*Group Mean	Group Median	Range	*Standard Deviation	Consensus
1	Are there any processes you would include or delete from this framework?	**A.** Add "Benchmark Best Practices" at step 2 or 3 of the framework	4	4	4	1	
		B. Organizational Culture needs to be emphasized more	5	5	2	1	YES
		C. Include an ethnographic analysis as part of the organizational culture assessment (to include domain analysis, taxonomic analysis, and componential analysis)	4	3.5	3	1	
		D. We have to define the outcome(s) we want to achieve. (one suggestion is ROI)	4	5	3	1	
		E. Need to define Performance Measure Metrics (in framework—Key Factor affecting decision process for step #4)	5	5	2	1	
		F. Knowledge management is currently viewed as an emerging discipline that combines change, intellectual capital, and information technology. Suggest framework cover al those bases.	4	4	3	1	
		G. References are exclusive to "organizational knowledge" which limits the entire focus to internal knowledge, excluding external knowledge or scanning the external environment for knowledge of potential value to the organization. Knowledge which is external to the organization is critical to the research, development, test, and evaluation mission, and is even more critical to the intelligence mission.	4	4	3	1	
		H. The framework should incorporate the development of a tactical/business plan to link project milestones and near-term priorities & objectives to the organization's long-range strategic goals and objectives	5	5	4	1	
		I. The very first phase of this framework jumps into "Knowledge" Strategy, Future "Knowledge" Requirements, etc. – this phase should focus primarily on the Business Strategy, goals, objectives, etc.. Business needs need to drive KM efforts, KM is nothing more than a means to facilitate faster, better informed (business) decisions. Also, beyond Senior Leader "Interest" one of the most important links to ensure a successful KM effort is actual Senior Leader "INVOLVEMENT."	4	4.5	2	1	
2	Are there any changes you would make to the order in which the decisions occur?	**A.** In selling any new idea (your KM project) you always have to design for successful support issues and design around (or to overcome) failure criteria	5	4.5	1	1	YES
		B. The framework should visibly demonstrate that every other corporate decision must flow from the organization's mission, vision, and strategy	5	5	2	1	
		C. There should be flexibility built into the order the decisions occur	5	5	2	1	YES
3	Are there any decision variables you feel are missing or are extraneous?	**A.** When selecting a knowledge management team, it is important to select the right people, identifying key personnel within the organization who may be uniquely suited to help the project. A knowledge management team should not consist of IT folks exclusively or volunteers.	5	5	2	1	YES
		B. Need to define who the customers are	5	5	2	1	YES
		C. Could ask explicitly if knowledge management is already being done but just not being recognized and called as such (i.e. brown bag "lessons learned" sessions, formal/informal mentoring relationships); if so, what can be done to institutionalize, expand, and improve the sharing of knowledge across communities	4	4	4	1	
		D. Supporting "infostructucture" and change catalysts such as policies, education and training interventions, and governance issues need to be considered.	5	4.5	3	1	
		E. You mention "budget constraints" but I would like to see a more explicit cost-to-benefit consideration factor	5	5	1	1	YES
		F. It is also important to identify key stakeholders in the affected process and what their views are. An assessment should be made to determine whether or not the organization is ready for change and if not, what needs to be done to make it ready for change, i.e., making the change is critical to the survival of the organization and the key stakeholders involved.	5	5	2	1	
		G. Technology is clearly not necessarily the most important thing, but perhaps the framework should include decision variables related to determining the appropriate type of technology necessary to accomplish the KM objective.	5	4.5	3	1	
		H. The framework is confusing. There are 5 sets of decision factors and really only 4 questions (albeit 5 tasks) I don't think they always correlate too well. Also, it mixes apples and oranges. ID & Map Tacit and Explicit Knowledge repositories (#5) is a whole new process or task....not a key decision making factor.	4	4	3	1	

Scaled Responses listed in table refer to aggregate Delphi responses using a 6-item Likert Scale (1=strongly disagree to
* Fractional values rounded to the nearest whole number

Research Questions

The intent of this research effort was to answer three research questions:

1. What is an appropriate methodology for identifying and selecting knowledge management projects for implementation in a large, diverse, multi-functional organization?
2. What are the key factors that can directly affect the successful implementation of knowledge management projects within that type of organization?
3. Given the current organizational structure and management philosophy within the DOD and the current state of existing knowledge management philosophy and initiatives throughout the DOD, the Air Force and its sister services, what factors should be considered when identifying, selecting knowledge management projects for implementation within the Air Force

Research Question 1

Efforts to answer the first research question were intended to provide a theoretical foundation upon which to create a knowledge management project selection framework that would answer the next two questions. The Delphi survey statements 1 through 4 and 8a through 13i were designed to answer Research Question #1. Survey statements 1 through 4 were part of the framework evaluation section of the Delphi surveys used to evaluate the need for a framework as well as the accuracy, completeness, and comprehensiveness of decision process and implementation methodology incorporated into the framework model. Survey statements 8a through 13i were part of the knowledge management theory section of the Delphi surveys. These statements were used to assess the author's interpretation of the key theoretical concepts that were extracted from the

literature review and used to develop the framework design and implementation process model.

Survey statement #1 received a 100% consensus in Round One and maintained that consensus through Round Two, as well as achieving opinion stability in Round Two. Survey questions 2, 3, & 4 did not receive consensus; however, a majority of the Delphi participants agreed with these statements (majority for statement 2 was 65% for Round 1 & 58% for Round 2; statements 3 and 4 received 71% and 66% for Rounds 1 and 2 respectively). Analysis of the response pattern between rounds and across the Delphi participant responses identified two distinct sub-populations within the Delphi group. The responses from these two groups resulted in a bi-modal response pattern that prevented these statements from achieving consensus. The sub-populations were identified by their organizational affiliation and the current level to which knowledge management had been addressed and knowledge management initiatives implemented within their respective organizations. These statements did achieve opinion stability in Round 2, indicating that participants were consistent in their individual responses and unlikely to be swayed by opinions of other members of the Delphi group, so it was highly unlikely that further rounds would bring the group closer to consensus. An important observation that could factor into the analysis of the Delphi group's failure to achieve consensus on these three statements is that, within the AF sub-population of the Delphi group (9 of 14 members), these statements achieved 100% consensus, providing a possible indication that these Delphi members felt the framework was appropriately designed for their organizational requirements. Since this population is the one that is expected to utilize the framework, their consensus factors into the overall Delphi result of non-consensus for these

statements, potentially mitigating the responses of those Delphi members who disagreed. The universal consensus of the Air Force sub-population within the overall Delphi Group could be interpreted as evidence of additional support for the creation and use of the framework. The knowledge management theory statements #8a-13i provide additional support to the assertion that Research Question #1 was answered by the development of a framework model, with 11 of the 12 statements achieving consensus. The one statement that did not achieve consensus (8a) received a majority of 58% in Round One and 75% in Round Two. Respondents agreed that it was important to incorporate this concept into the framework, but there was no clear consensus that they all agreed with the way the statement was structured.

General comments regarding Statement 8a:

- A new KM effort may fundamentally change the vision of the organization -- grounding your KM efforts in the existing vision may limit your future efforts and directions
- Most organizations we have dealt with have not developed a km strategy. In fact, the degree of success of the pilot may be what actually makes the organization develop such a strategy.
- The organization's corporate K vision and strategy are critical success factors.
- The organization's corporate/enterprise vision and strategy are critical to any effort undertaken, and occurs outside of the KM framework; there should be no separate "knowledge vision" or "knowledge strategy."

The responses of the Delphi group indicate that there is a consensus that a framework is an essential component of any knowledge management effort an organization undertakes. The responses also indicate that the framework developed through this research effort provides a suitable process flow for initiating knowledge management efforts within an organization.

Research Question 2

Research Question #2 was designed to identify the specific factors within the framework process flow that should be addressed and factor into any knowledge

management effort implemented within a large, diverse, multi-functional organization. The Delphi survey statements 5,6 and 14a through 27i were used to answer this research question. Survey statements 5 and 6 were part of the framework evaluation section of the Delphi surveys used to assess if the key decision variables had been identified and that they were correctly placed within the framework's process flow and associated with the correct decision process. Survey statements 14a through 27i were part of the knowledge management theory section of the Delphi surveys. These statements were used to assess the author's interpretation of the theoretical concepts that were extracted from the literature review, used to develop the framework's key decision variables and incorporate them within the appropriate decision process and in the right order within the framework design and implementation process model.

Survey statements #5 and #6 both achieved consensus and opinion stability in Round Two from the Delphi group, with 12 of 14 participants (86%) agreeing with both statements for Round One and 11 of 12 participants (92%) agreeing with both statements in Round Two. The survey results for the knowledge management theory statements 14a through 27i were mixed, with 17 of 28 statements achieving consensus through Round Two (eleven achieved consensus in Round One and six achieved consensus in Round Two). Of the remaining questions that did not achieve a consensus of the Delphi group through Round Two, a majority of respondents agreed with all eleven statements, to varying degrees, in Round One and all but three statements in Round Two. The decrease in response rate of Delphi participants from Round One to Round Two for the knowledge management portion of the survey explains the decrease in the majority opinion for the remaining three statements. When reconciling the disparate results from the Delphi

participants regarding the knowledge management theory portion of the survey with the clear consensus for the framework evaluation statements 5 and 6, several factors are identified that could have affected consensus. While most everyone agreed with how the knowledge management theory statements were interpreted and incorporated into the framework, there were varying levels of disagreement with how current knowledge management theory regarding these areas was interpreted and identified in the knowledge management theory statements. The lack of consensus on the knowledge management theory statements did not seem to negatively impact how the Delphi Group rated the accuracy, completeness, and comprehensiveness of the final product: the framework. It is possible to view this lack of consensus as evidence that knowledge management is a new and evolving discipline, one in which there will be a diversity of opinion on what the underlying theory means, but there appears to be agreement on how it should be applied.

Research Question 3

Research Question 3 was designed to take a more specific look at knowledge management and how it should be applied within the DOD and specifically, within the Air Force. The composition of the Delphi group was a critical component of the research process for answering this research question. The fact that the Delphi group was composed of a cross-section of knowledge management experts from across the DOD with a variety of organizational and functional responsibilities provided a variety of viewpoints from which to analyze the framework. Individual comments received as part of the survey process, and incorporated throughout this thesis, greatly contributed to understanding how best to implement the proposed framework within a DOD organization by providing a specific DOD, and sometimes more unique Service-level,

focus to knowledge management issues and through the contribution of personal organizational knowledge regarding knowledge management. Although there was a mixed response for framework evaluation statement 7, this response did not seem to be a reflection that the framework would not provide a useful and beneficial contribution to any knowledge management effort, but rather seemed to be a reflection on how the author expressly tied the potential impact of using the framework to the eventual success of any knowledge management effort. Yet even here, there was a majority in both Rounds One (58%) and Two (67%) who agreed with the proposed statement that the utilization of this framework would ensure the respective knowledge management project would have a higher probability of success than if it were not used. Among Air Force Delphi participants the approval rate was even higher, with 7 of 8 participants (88%) agreeing with this statement in Round One and 6 of 7 (86%) agreeing in Round Two.

Based on the general levels of consensus regarding the framework within the Delphi group and the almost universal consensus of the participants, who were Air Force members, it would seem that the framework should be included as an integral part of any knowledge management effort initiated within the Air Force. In keeping within the tenets of knowledge management, this framework is not meant to be interpreted literally, but rather to provide a starting point and modified as needed to meet the diverse needs of the various functional organizations across the Air Force.

A broader, but not quite so obvious, contribution is the consensus on key aspects of knowledge management theory that were identified as a result of this research. As knowledge management evolves throughout the DOD, a clear and consistent level of understanding will need to be developed to ensure each service's knowledge management

efforts contribute to the overall effectiveness of the DOD. It is possible that this research effort can provide a foundation for that understanding. By identifying some areas of knowledge management upon which there is a clear and consistent level of understanding and agreement, a basic universal construct for knowledge management within the DOD can be developed and nurtured through the implementation of further research in the area of knowledge management.

Conclusion

The first Delphi survey began with an open-ended question asking the Delphi participants why they felt it was important to have a framework. This question was asked at the beginning of the survey to get the participants to think about what they expected a framework to accomplish and to use their expectations to guide their answers as they completed the survey. The survey ended with another open-ended question asking those same participants what they felt constituted a successful knowledge management project, in effect giving them the opportunity to summarize their survey inputs into a few sentences. It is fortunate that one of the functions of the survey wasn't to identify a consensus on these two open-ended questions, because there was a great deal of diversity in the responses. There were several consistent themes that were evident in most, and in some cases, all of the responses. Below are the replies to the first open-ended question:

Why is it important to have a framework identifying key decision variables that decision-makers should address when selecting a KM project?

- **It is important to have at least an intuitive framework, a formal framework is important for many. KM is too new a concept to most and without a framework (intuitive or formal) some people would approach a KM project as a "feel good" exercise (and that is a waste of time).**
- **KM initiatives can be time consuming and costly. They must be targeted at critical activities that can make a difference in the organization's bottom line.**

Also, the pilot initiative needs to have a high success probability since you are using it as a catalyst for other process owners to adopt km.

- **It is as important in selecting a KM project to have appropriate selection criteria based on agreed upon organizational vision, goals, and objects as it is to selecting the next generation tactical fighter aircraft. This is standard accepted practice when dealing with operational mission objectives and weapons acquisition programs. Unfortunately, it has not been the case in providing information technology and services.**
- **Every project needs planning. KM projects by their very nature involve many more varied factors than a typical project (since they usually touch not only a particular subject matter, but also organizational and personnel behaviors). The more complex the project the more important complete planning is. A good framework is a starting point to keep planning on track.**
- **Without some type of framework & needs analysis process to frame the intended KM effort, the possible KM related actions are simply too extensive and will likely lack the kind of focus/boundaries necessary for success.**
- **We have to know exactly what we have to do**
- **If you don't have a road map, any road will take you to a destination.**
- **A framework encourages the use of consistent criteria in developing requirements documents, business case, risk assessments, etc. to support competition for limited resources**
- **Encourages the use of consistent criteria in developing requirements documents, business case, risk assessments, etc., to support competition for limited resources.**
- **Must be careful to ensure adherence to the framework does not stifle innovation and idea generation that may be outside the framework**

While all of these inputs are unique from one another, they provide a rich image of what people expect a knowledge management framework to do, from the opinions of the senior leaders who are guiding the implementation of knowledge management, both within the individual DOD service organizations and across the DOD, to the individuals who will be responsible for implementing the strategies and objectives implemented by senior management. Even with this great diversity of input, a few consistent themes can be found among the individual responses. The first is the desire/need for consistency. Most participants saw a framework as a guide, a roadmap, or just a starting point that provided some continuity, familiarity, and consistency throughout the knowledge management project selection and implementation process. Another common thread was

focus; a framework provides a means of focusing ("focus/boundaries", "keep on track", "targeted at critical activities", "based on organizational vision, goals, etc.") the knowledge management project's efforts towards achievement of the organization's strategic goals. The final, and perhaps most important, theme identified was that a framework gives an understanding of the complex concept of knowledge management, provides a methodology for identifying what is expected or required, and showing users how to achieve those expectations or requirements. The first survey ended with a reflection by each Round One Delphi participant on how they would describe a successful knowledge management project. It seems appropriate to end the chapter that analyzed the results of the Delphi surveys with a presentation of each Delphi member's reflection on what they felt defined a successful knowledge management project.

A SUCCESSFUL KNOWLEDGE MANAGEMENT PROJECT IS ONE THAT...

- **increases the rate of innovation**
- **improves decision making**
- **provides a positive benefit-to-cost comparison**
- **fits into the agenda of the enterprise innovators**
- **is critical to meeting the organization's strategic objectives**
- **optimizes the use of its intellectual capital by helping an organization achieve its operational and/or strategic objectives**
- **enhances the organization's acquisition and use of knowledge with only acceptable and sustainable changes in effort by the organization's members**
- **isn't a project; it is a new way of thinking and acting to transfer explicit and tacit knowledge across time, space, and boundaries as part of the everyday business**
- **enhances individuals' ability to collaborate in a flexible manner to make the best use of the organization's intellectual capital in order to achieve organizational objectives**
- **properly balances people, the mission/processes, and technology to facilitate faster, better informed decisions; increase productivity; expand collaboration; and spark greater levels of creativity**

V. CONCLUSIONS & RECOMMENDATIONS

"To me, this is the essence of knowledge sharing. It's all about contribution, it's all about the respect for others' opinions and views, it's all about a good facilitation and synthesis process, it's all about the distribution of lessons learned from this knowledge process, and it's all about access to packaged knowledge and key insights that become the starting points for individual learning."

Bob Hiebeler

Conclusions

During this research effort, much of what was learned could not be expressed directly in the framework, either because it was not specifically applicable to the decision process or because it was not focused enough to place within the framework. Below are four key areas that were identified through this research effort that seemed to apply to the overall knowledge management selection and implementation process, not just a specific portion of the framework.

First, there seems to be no closely held secret to knowledge management. The underlying tenets of knowledge management are part of any good management course (strategic planning, organizational management, human resources management, identification and management of critical business processes, etc.) and should be common knowledge to any manager with a formal management education. These tenets are identified throughout the framework and should be familiar to most managers. The key is to be able to direct these principles toward a concept that, to many managers, is unfamiliar territory. From an organizational perspective, knowledge management is nothing more than identifying what knowledge is important to the success of your organization and then developing methods and processes to use your existing assets and

acquiring new assets to ensure the continued success of your organization. Organizations have been doing this for some time now: advertising agencies, consulting services, the entertainment industry, and software development houses to name a few. Knowledge management is a way of providing a consistent methodology for doing this that can be utilized by organizations that have identified knowledge as a valuable organizational resource and want to use that resource to create more value for their organization. Hopefully, this framework can provide a consistent methodology for those individuals who are selecting and implementing knowledge management efforts and initiatives within their organization.

Second, based on the results of the Delphi surveys, there is already a relatively consistent awareness and understanding of basic knowledge management principles and practices within the Air Force functions responsible for implementing knowledge management across the organization. Also, this awareness and understanding is relatively consistent across the DOD, at least within the functional organizations responsible for guiding their organization's knowledge management efforts. This relative consensus of understanding regarding basic knowledge management principles and practices can provide a basis for any future knowledge management efforts and enable the creation of a DOD-level construct of knowledge management that could be used to focus knowledge management efforts towards a common goal and prevent the creation of organizational stovepipes for knowledge management. It is hoped that this research effort can help support the creation of this DOD-level knowledge management construct.

Third, the literature suggests that knowledge management is not so much about managing knowledge as it is about managing the factors involved with knowledge

creation and use: people, processes, and information. Knowledge management is about applying the right mix of people, processes, and information to generate and use the knowledge necessary to accomplish a desired goal. It is easier to apply existing management principles to the process of knowledge management if the focus is on the factors that are required to create and use knowledge instead of focusing on the knowledge itself. This concept is consistent with all other management disciplines as well: materials & logistics management, operations management, financial management, human resources management, etc.; their primary focus is on the efficient utilization of the resources within their discipline to achieve established goals. It is hoped that the underlying process flow imbedded in the framework will help those who use it to apply the management skills and knowledge they currently have and not require the acquisition of a new set of management skills and knowledge.

And finally, a key concept consistently identified throughout the course of this research was that knowledge is less a product to be captured, stored, and manipulated and more a process that should be guided, focused, and applied. Knowledge is situationally dependent; on the individual, on the task at hand, on the availability of current and related information, etc. What is considered knowledge in one situation becomes information or data in another situation. The focus of knowledge management should be more on the process and less on the end result. Goals, strategies, and objectives change rapidly, especially in today's business (and military) environment and the danger of focusing on the end result is that when the target changes, the vehicle used to provide us with the knowledge for that one specific target goal/objective will no longer be useful for providing the knowledge needed to meet new goals and objectives. Hopefully, this

framework is flexible enough so that anyone using it to select and implement a knowledge management effort in his or her organization will have designed the effort so that it is dynamic enough to meet the changing needs of his or her organization.

Another area of potential knowledge growth concerns the inputs from Delphi members for modifying the existing framework. There were many excellent and pertinent suggestions that were proposed throughout the Delphi survey process, but there was not enough participation from Delphi members regarding the proposed modifications to make any specific recommendations. There were 20 proposed modifications to the existing framework that were proposed by the 14 Delphi members who participated in Round One. Six Delphi members responded to the portion of the Round Two survey that included these 20 proposed modifications. The lack of Delphi participation on this portion of the Round Two survey prevented a consensus from being reached on any specific modification, but there was universal agreement among the six Delphi members who participated that the following 6 modifications be incorporated into the framework:

- Organizational Culture needs to be emphasized more
- In selling any new idea (your KM project) you always have to design for successful support issues and design around (or to overcome) failure criteria
- There should be flexibility built into the order the decisions occur
- When selecting a knowledge management team, it is important to select the right people, identifying key personnel within the organization who may be uniquely suited to help the project. A knowledge management team should not consist of IT folks exclusively or volunteers.
- Need to define who the customers are
- You mention "budget constraints" but I would like to see a more explicit cost-to-benefit consideration factor

Limitations

Application Limitations

Air Force knowledge management efforts are very young when compared with corresponding efforts in the Army and the Navy. The Air Force lags both in the integration of knowledge management into existing organizational business/strategic practices and planning processes. While both the Army and the Navy have knowledge management strategic plans directly tied to their organizations' respective strategic visions, strategies, and strategic objectives, the Air Force has no such plans. Consequently, the Air Force's view of knowledge management will be more rudimentary in the initial stages that the views currently held within the Army and Navy. It is beyond the scope of this research project to identify a strategic blueprint for implementing knowledge management within the Air Force. What this research effort is intended to do is fill an interim need of Air Force decision makers and project managers until the Air Force has developed its own strategic blueprint for implementing knowledge management. It is hoped that this framework will help in the development of that blueprint.

Methodology Limitations

From a methodological standpoint, there is the possibility that the decrease in participation rates between Round One and Round Two could have impacted the results of some portions of the survey. The decrease in the participation rate for the framework evaluation statements was relatively minor (two individuals did not participate in Round Two) and since opinion stability was achieved in Round Two on those statements, it is unlikely that the decreased participation rate negatively affected the overall results in this

area. On the knowledge management portion of the survey (statements 8a through 33i), participation in Round One was 11 out of 14. While this was lower than for the framework portion of the survey, the organizational level diversity of the participants was not impacted and should not have affected the overall results of Round One. All but one organization was represented and all functional and organizational levels that were represented in the framework evaluation survey were also represented here. For Round Two, the participation rate for the knowledge management theory portion of the survey decreased by three members (8 out of 14 total Delphi participants). Time, job-related responsibilities, and travel prevented some members from participating as fully as they would have liked. This decrease in participation did seem to have a significant affect on some survey items, resulting in a consensus on some items when individuals who participated in Round One were unable to participate in Round Two. There is no set procedure on how to address the inputs of those members who are unable to participate through all rounds. I believe that since this was an exploratory research effort, it was more important to retain their initial results than to exclude them from the final evaluation. Delphi results are not meant to be extrapolated out to a larger population using a stochastic method, so it was determined that it would be better to retain the full results of both rounds, irrespective of the changes in participation level, to provide as much richness to the data that was collected as possible. Also, there is no way to determine for sure if the members who did not participate in Round Two would have maintained their Round One responses or changed them as a result of the Round One inputs from other Delphi members.

Finally, Delphi results are not meant to be applied to a larger population using some form of inferential statistical model. The Delphi members are experts in their area specialty, and their responses throughout the Delphi study reflect their educated opinions, based on their knowledge and experience in their expert area, not statements of scientific fact. The results reported from the Delphi study should be viewed as the cumulative consensus of a group of experts and be given the proper weight accorded expert opinion.

Recommendations for Future Research

Now that an initial framework has been identified, additional research needs to be done to validate this framework. Future research could include the use of a pilot study to validate, in a field environment, the concepts presented in this framework.

Follow-on research could also include identifying the impact this framework had on existing Air Force operational activities and how future framework development could be modified to increase the effective utilization of those frameworks in the field. Twenty modifications were proposed by the Delphi members throughout the Delphi process, but the response to the portion of the Delphi survey that incorporated those modifications for evaluation by the Delphi group was considerably smaller than was the response to any other portion of the survey (6 out of 14 members, or 43%). Given the limited response, it is recommended that a future research effort be conducted to solicit a broader Delphi response before incorporating these six modifications into the framework. Any future research effort should begin with the full body of 20 proposed modifications.

There exists as well a need for corporate-level guidance and direction that could be used to provide an enterprise-wide focus for knowledge management efforts throughout the Air Force and help guide knowledge management implementers in their

efforts. A corporate knowledge vision and strategy can provide an enterprise-level focus to current and future knowledge management efforts. A sound understanding of knowledge management should exist before a knowledge management and knowledge vision are developed and incorporated into the Air Force's strategic vision and plan. The key knowledge management concepts identified in this research effort are a start, but are only a beginning. A more robust construct of knowledge management needs to be developed that incorporates the unique missions and requirements of the Air Force and how the interaction between these unique mission requirements will impact both future knowledge management initiatives and future force capabilities and mission requirements.

To ensure the continued viability of current knowledge management initiatives and provide a fertile environment for future endeavors, the cultural atmosphere within the Air Force needs to shift to one that promotes and utilizes knowledge management principles and practices. There were several Delphi members who felt the proposed framework should provide a greater focus on organizational and cultural aspects of knowledge management. The focus of this research effort did not include an extensive analysis on an organization's culture and how cultural issues would factor into the implementation of knowledge management efforts within an organization. Additional research is needed to incorporate these factors more fully into the existing framework, or possibly to create a new framework that is focused primarily on an organization's cultural and behavioral issues and how to change an organization's culture so that it supports the principles and practices of knowledge management. From this cultural change will flow the energy and individual desire that will sustain the introduction of knowledge

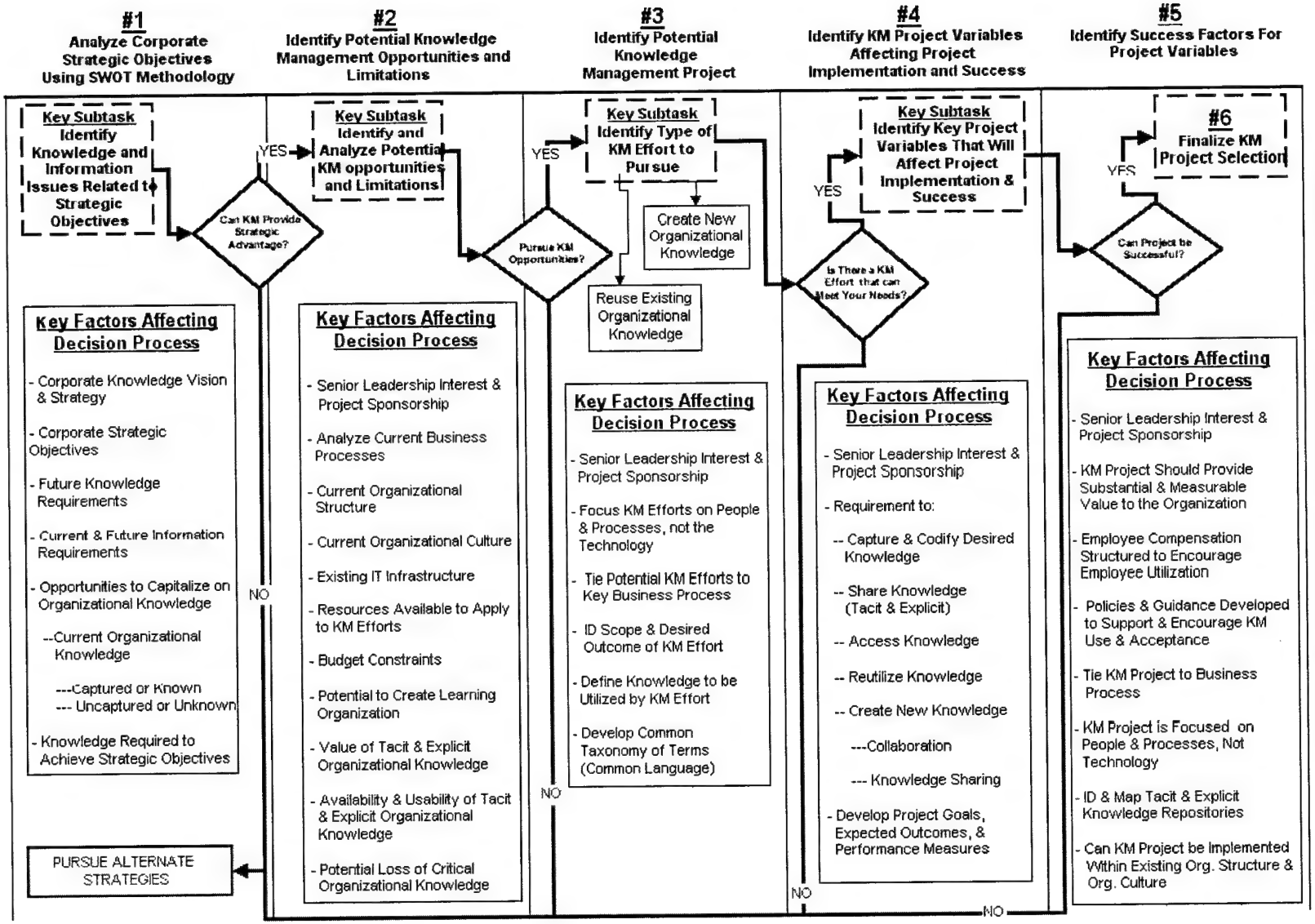
management concepts and practices introduced within the organization. This additional research should include the identification of how knowledge management advocacy and participation can be effectively incorporated into the daily business activities of the Air Force.

The proposed framework provides one perspective for implementing knowledge management within an organization, primarily from the viewpoint of the individual selecting and implementing knowledge management projects. There are multiple perspectives from which to view knowledge management. Knowledge management is concept that is not normally successful using a one-size-fits-all cookie-cutter approach. Additional research needs to be done to identify what types of knowledge management initiatives should be developed and nurtured to institutionalize knowledge management within the Air Force and as they are developed, how should they be deployed and what organizations would benefit the most from what types of initiatives. This framework can provide the foundation of that effort, but further research needs to be conducted to develop more specialized modes and approaches to ensure every opportunity is identified and each initiative is implemented using a methodology that is understood and accepted by the potential users.

As the Air Force's deployment and use of knowledge management initiatives evolves, the needs of its members will change, much like the needs of some of the other services have changed. This framework is only an interim step in the evolution of knowledge management within the Air Force organization. Additional research needs to be done to develop a more dynamic, enterprise-level framework that is focused on using knowledge management as a mechanism for promoting organizational change, creating a

cultural environment that promotes and instills the basic principles of knowledge management into the organization's daily business practices. This research should focus on how the Air Force can should apply its current and future financial and human resources towards knowledge management initiatives to achieve the greatest level of efficiency and return for its investment. It is not a question of "Should we invest in knowledge management?" but rather "How should we invest to achieve the greatest return on our investment and promote the efficient utilization and future growth of our organization's knowledge?" As Ben Franklin once said:

"An Investment in Knowledge Pays the Best Dividends."
Benjamin Franklin



Appendix A – Proposed Framework Model

APPENDIX B – Delphi Group Contact Sheet

NAME	TITLE	ORG	E-MAIL	PHONE (DSN)	PHONE (COMM)
Mr Bao Nguyen (GM-15) ***SPONSOR***	Principle Deputy Assistant Secretary, Business & Information Management, Policy	AF-CIO (PDAS/PIM)	nguyenb@pentagon.af.mil	425-6310	(703) 588-6310
Dr Leonard Foldenaur ***CO-SPONSOR***	Information Management Branch Chief	AFCA/ITCM	Leonard.Foldenauer@scott.af.mil	576-5699	(618) 256-5699
Mike Yoemans	Director for Functional Process Improvement	Office of the Assistant Secretary of Defense (C3I)	YoemansM@osd.pentagon.mil	664-1474	(703) 604-1474
			Mr. Mike Yoeman's Secretary: Georgia	664-1565	(703) 604-1565
Ms Alex Bennet	Navy CKO and Co-Chair, Federal CIO Council KM Working Gp	US Navy	Bennet.Alex@HQ.NAVY.MIL	327-5585	(703) 607-5585
			Ms Bennet's Assistant: Jack Hawker	327-5604	(703) 607-5604
Ms Miriam Browning	Director of IM and Army CKO Equivalent	US Army	Exec's e-mail address Shawn.Gresham@HQDA.Army.Mil	227-6593	(703) 697-6593
Dr Robert Neilson	National Defense University (NDU) IRM College CKO	National Defense University IRMC Faculty	neilson@ndu.edu	325-3895	Wk (202) 685-3895 Fax (202) 685-3974
Col Kevin Kirsch	AFMC Deputy SC	HQ AFMC/SC	kevin.kirsch@wpafb.af.mil	787-1690	(937) 257-1690
Mr Randy Adkins	AFMC KM Program Manager	HQ AFMC/DRI	Randy.Adkins@wpafb.af.mil	986-0822	(937) 656-0822
LtCol Maureen Casey	AFRL DE/VS Chief Knowledge Officer	AFRL DE & VS/VSIR	Maureen.Casey@Kirtland.af.mil	246-4043	(505) 846-4043
Mr Alex Mesevich	IM Branch Action Officer	AFCA/ITCM	alex.mesevich@scott.af.mil	576-5699	618-256-5699
Ms Michelle Casey	IM Branch Action Officer	AFCA/ITCM	Michelle.Casey@scott.af.mil	576-5699	618-256-5699
Mr Fred Rexroad	Operations Research Analyst	ASC/ENMS	fredrick.rexroad@wpafb.af.mil	674-4666	(937) 904-4466
Capt (0-6) James L Kantner	Navy KM Website POC		Kantner.james@hq.navy.mil	329-0047	(703) 601-0047
Lt Col Mike Dohorovich		Office of the Assistant Secretary of Defense (C3I)	michael.dohorovich@us.army.mil	664-1601	(703) 604-1601

APPENDIX C – Round One Questionnaire for Delphi Group

SURVEY INSTRUCTIONS

1. Please read the following instructions before filling out this questionnaire. This questionnaire consists of open-ended and scaled questions separated into five sections.

2. The rating system for the scaled questions ranges from a low of 1 to a high of 6. Please type the selection you feel best reflects your opinion in the appropriate column to the right of the question. **Please refer to the attached framework when selecting your response.**

3. Each of the open-ended questions has space provided for your reply. If there is insufficient room, continue to type and I will take care of any formatting problems when I receive the forms [each section is separated by hard (inserted) page breaks, so it is possible that additional pages could be added].

4. Specific responses of each respondent will be treated anonymously. However, each participant's name, organization, and contact information will be included in a list of contributors unless he/she desires to be excluded. **Please identify below if you do not wish to be included**.
   - I_____wish to be included on the list of contributors.

5. Please fill out "Participant Information" section below

6. Please save completed questionnaire as an MS Word document and e-mail back to me at william.bower@afit.af.mil. and CC: Billbower01@aol.com.

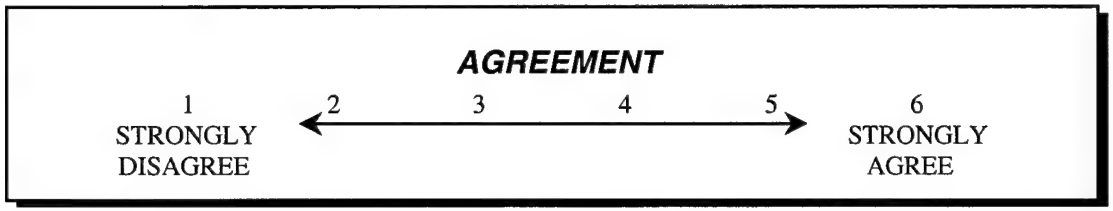
PARTICIPANT INFORMATION
Participant Name _____

Participant Organization/Office Symbol_____

6 STEP KM PROJECT SELECTION DECISION PROCESS FRAMEWORK

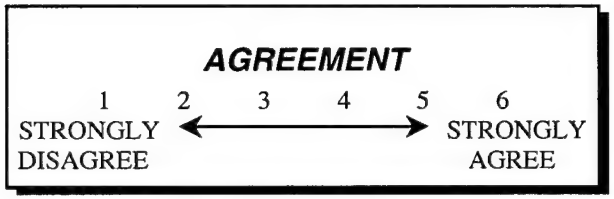
1. Analyze Corporate Strategic Objectives Using SWOT (Strengths, Weaknesses, Opportunites, Threats) Methodology
2. Identify Potential Knowledge Management Opportunities and Limitations
3. Identify Potential Knowledge Management Efforts
4. Identify KM Project Variables Affecting Project Implementation and Success
5. Identify Success Factors for Project Variables
6. Finalize KM Project Selection

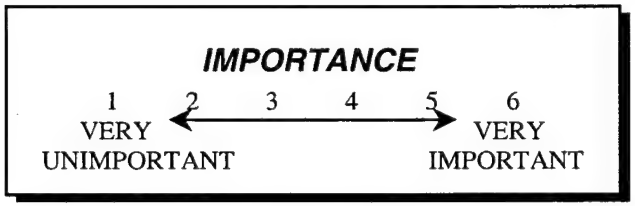
QUESTIONS REGARDING THE OVERALL FRAMEWORK



	Scaled Response (1 - 6)
1. It is important to have a framework identifying key decision variables that decision-makers should address when selecting a knowledge management (KM) project?	
- **Why?**	
2. This framework successfully captures the key decision-making processes that should occur when selecting and implementing a KM project?	
- **Are there any processes would you include or delete from this framework?**	
3. This framework accurately identifies the key decision-making processes that should occur when selecting and implementing a KM project?	
4. This framework successfully identifies the order in which the decision-making processes should occur when selecting and implementing a KM project?	
- **Are there any changes you would make to the order in which the decisions occur?**	
5. This framework successfully identifies the key decision variables to be considered when selecting a KM project?	
- **Are there any decision variables you feel are missing or are extraneous?**	
6. This framework accurately identifies the individual key decision variables for each key decision-making process?	
7. Utilizing this framework will ensure the selected KM project will have a higher probability of success when implemented than if this framework were not utilized.	

QUESTIONS/STATEMENTS REGARDING DECISION PROCESS FLOW

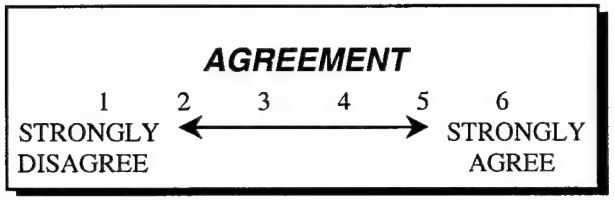


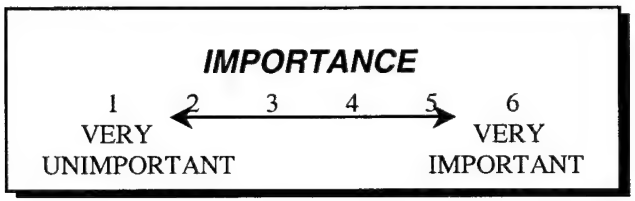


The statements below refer to the development of the decision flow and order of each decision identified in the decision process. Please indicate how much you agree or disagree with each statement and how important you feel it was for the item to be considered when developing the framework.

	Agreement	Importance
8. An organization should establish a corporate knowledge vision and knowledge strategy before an analysis of corporate strategic objectives (SWOT – strengths, weaknesses, opportunities, threats) can be performed.		
9. The first process in selecting a KM project should be an analysis of corporate strategic goals to make a determination whether KM can provide the organization with a strategic advantage.		
10. Active, visible sponsorship by senior leadership needs to begin at the very first step of the KM evaluation and project selection process and continue through each step of the proposed KM project decision selection framework.		
11. The organization's organizational structure and management philosophy are critical factors that must be addressed early in the KM project selection process because they can affect decisions made during each step of the process.		
12. Prior to identifying KM project variables affecting project implementation success, definitions of key terms should be agreed upon in advance so that everyone has a clear understanding of the KM project's intended purpose.		
13. An organization's corporate knowledge vision and knowledge strategy are the primary guidance for identification, development, and implementation of all KM projects undertaken throughout the organization to ensure each KM project's goals are consistent with organizational objectives.		
Comments:		

QUESTIONS/STATEMENTS REGARDING IDENTIFICATION OF KEY DECISION VARIABLES

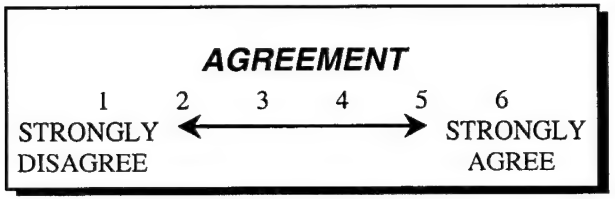


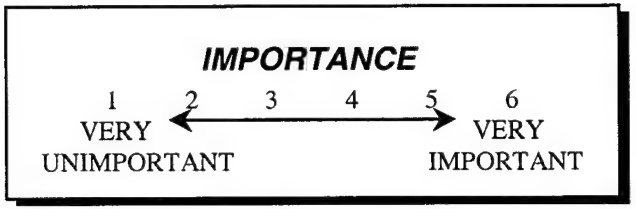


The statements below refer to the identification of critical project variables that directly affect a knowledge management project's implementation and ultimate success. Please indicate how much you agree or disagree with each statement and how important you feel it was for the item to be considered when developing the framework.

	Agreement	Importance
14. To achieve the greatest measure of success across the entire organization, potential KM projects should focus on a key business process within the organization that directly supports the organization's strategic vision and goals.		
15. The strategic goal of KM projects that reuse existing organizational knowledge (vs. creating new knowledge) is to streamline and enhance the organization's standard operating procedures and business methods by taking advantage of methods that have proven to be successful.		
16. An organization's structure (flying wing vs. research lab, centralized vs. geographically separated), combined with the organization's knowledge strategy, should affect the selection and implementation strategy of a KM project.		
17. When identifying potential KM efforts, it is important to identify the potential impact the organization's culture will have on the acceptance and utilization of the KM project and how that impact will affect the successful implementation of the KM project.		
18. Part of identifying potential knowledge management efforts should include the development of clearly defined goals and measures of success that are directly tied to or support the organization's overall strategic vision and objectives.		
19. KM projects designed to capture, codify, and utilize an organization's existing organizational knowledge should restructure employee compensation procedures to encourage and reward employee participation.		
20. Organizational knowledge provides its greatest value to the organization when it is transferred from knowledge holders to knowledge users in a timely manner and with enough supplemental information (context) so that the existing knowledge can be applied to the knowledge user's current situation.		
Comments:		

STATEMENTS REGARDING SUCCESS FACTORS FOR PROJECT VARIABLES

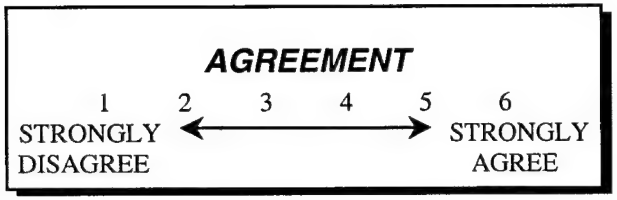


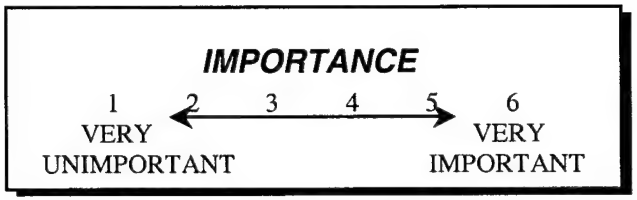


The statements below refer to the identification of success factors for project variables that directly affect a knowledge management project's implementation and ultimate success. Please indicate how much you agree or disagree with each statement and how important you feel it was for the item to be considered when developing the framework.

	Agreement	Importance
21. A military organization's tacit organizational knowledge, residing primarily within informal communities of practice, forms the core of that organization's distinctive competence.		
22. Tacit knowledge residing within organizational members loses much of its unique value when it is captured and stored in a organizational knowledge database because the knowledge loses its dynamic component and becomes static when stored.		
23. For organizations to effectively transfer and utilize organizational best practices and lessons learned, both the explicit and the tacit knowledge associated with the best practice/lesson learned must be identified and transferred or made available to potential users.		
24. The most effective way to transfer the context (tacit knowledge) underlying organizational processes that create and sustain organizational knowledge is through the use of communities of practice and knowledge pointers to tacit knowledge repositories.		
25. Knowledge management projects designed to capture and codify organizational knowledge must have procedures in place to ensure the captured knowledge remains current and correctly reflects the organization's strategic goals and direction.		
26. Although a KM project can both reuse existing organizational knowledge and create new organizational knowledge, the project goals should clearly identify the overall focus of the KM project; reusing existing knowledge or creating new knowledge.		
27. Two common types of knowledge distribution strategies are push strategies and pull strategies. Of these two types, the pull strategy is the most effective method of providing the right knowledge to the right person at the right time.		
Comments:		

QUESTIONS/STATEMENTS REGARDING KM THEORY





The statements below provided some of the theoretical foundation supporting this framework. Please indicate how much you agree or disagree with each statement and how important you feel it was for the item to be considered when developing the framework.	Agreement	Importance
28. The greatest barrier to transferring Best Practices and Lessons Learned within an organization is the lack of absorptive capacity of the potential recipients of the knowledge. ("absorptive capacity" is defined as the ability of a knowledge recipient to evaluate, assimilate, and apply new knowledge successfully to a particular situations)		
29. KM projects designed to capture and share an organization's best business practices/lessons learned add value to the organization by enabling users to make more informed business decisions and by incorporating these practices into the organization's standard operating procedures to make business processes more efficient.		
30. KM projects designed to create new organizational knowledge add value to the organization by fostering inter-organizational collaboration and transfer of tacit knowledge, diffusing the organization's tacit knowledge throughout the organization.		
31. Organizations that see knowledge as a physical resource to be captured and managed instead of a dynamic process based upon human cognitive abilities will not achieve the full potential business advantages that are possible with knowledge management.		
32. The primary focus of knowledge management is to enable the organization to share organizational knowledge throughout the organization for the purpose of making more informed decisions that will complement the organization's strategic goals.		
33. Knowledge management is not really about managing knowledge as a physical resource; rather it is about managing access to and utilization of existing organizational knowledge that resides within the organization to achieve the organizations strategic goals.		
Comments:		
And one last question. How would you complete this statement? A successful knowledge management project is one that		

APPENDIX D – Delphi Results Round One Analysis

	Questions	A	B	C	D	E	F	G	H	I	J	K	L	M	Total # of Inputs	MEAN	MEDIAN	MODE	SD (rounded)	SD (actual)	RANGE
SECTION 1	1	4	4	4	4	4	5	5	5	5	6	6	6	6	13	4.9	5	4	1	0.9	2
	2	3	3	3	3	3	4	4	5	5	5	5	5	5	13	4.1	4	5	1	1	2
	3	3	3	3	3	4	4	4	4	5	5	5	5	5	13	4.1	4	5	1	0.9	2
	4	3	3	3	3	4	4	4	5	5	5	5	6	6	13	4.3	4	3	1	1.1	3
	5	3	3	4	4	4	4	4	5	5	5	5	5	6	13	4.4	4	4	1	0.9	3
	6	3	3	4	4	4	4	5	5	5	5	5	5	NI	12	4.3	4.5	5	1	0.8	2
	7	3	3	3	3	3	4	4	5	6	6	6	6	6	13	4.5	4	3	1	1.4	3
SECTION 2	8a	1	1	1	2	3	4	4	5	5	6	6	NI	NI	11	3.5	4	1	2	2	5
	8i	3	3	4	4	5	5	6	6	6	NI	NI	NI	NI	10	4.7	5	6	1	1.2	3
	9a	1	4	4	5	5	5	6	6	6	6	6	NI	NI	11	4.9	5	6	2	1.5	5
	9i	1	4	5	5	5	5	6	6	6	6	6	NI	NI	11	5	5	5	2	1.5	5
	10a	4	5	5	6	6	6	6	6	6	6	6	NI	NI	11	5.6	6	6	1	0.7	2
	10i	6	6	6	6	6	6	6	6	6	6	6	NI	NI	11	6	6	6	0	0	0
	11a	4	4	4	5	5	5	6	6	6	6	6	NI	NI	11	5.2	5	6	1	0.9	2
	11i	4	4	4	4	5	5	6	6	6	6	6	NI	NI	11	5.1	5	6	1	1	2
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	12i	3	3	4	5	5	5	5	5	6	6	6	NI	NI	11	4.8	5	5	1	1.1	3
	13a	1	2	4	4	5	5	5	6	6	6	6	NI	NI	11	4.6	5	6	2	1.7	5
	13i	3	4	4	5	5	6	6	6	6	6	6	NI	NI	11	5.2	6	6	1	1.1	3
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	14i	5	5	5	5	6	6	6	6	6	6	6	NI	NI	11	5.6	6	6	1	0.5	1
	15a	1	1	3	3	3	4	5	5	5	6	6	NI	NI	11	3.8	4	3	2	1.8	5
	15i	1	1	2	3	4	4	5	5	6	6	6	NI	NI	11	3.9	4	6	2	1.9	5
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	16i	3	3	3	4	4	5	5	5	5	6	6	NI	NI	11	4.5	5	5	1	1.1	3
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	17i	4	4	5	5	6	6	6	6	6	6	6	NI	NI	11	5.5	6	6	1	0.8	2
	18a	4	4	5	5	5	5	6	6	6	6	6	NI	NI	11	5.3	5	6	1	0.8	2
	18i	4	4	5	6	6	6	6	6	6	6	6	NI	NI	11	5.6	6	6	1	0.8	2
	19a	2	2	3	3	4	4	5	5	6	6	6	NI	NI	11	4.2	4	6	2	1.5	4
	19i	1	2	2	3	4	4	5	5	6	6	6	NI	NI	11	4	4	6	2	1.8	5
	20a	2	3	4	5	5	5	6	6	6	6	6	NI	NI	11	4.9	5	6	1	1.4	4
	20i	3	3	4	4	5	5	5	6	6	6	6	NI	NI	11	4.8	5	6	1	1.2	3
SECTION 4	21a	3	3	4	4	4	4	5	5	5	6	6	NI	NI	11	4.5	4	4	1	1	3
	21i	3	3	4	4	4	5	5	6	6	6	6	NI	NI	11	4.7	5	6	1	1.2	3
	22a	1	2	3	3	4	4	5	5	5	6	6	NI	NI	11	4	4	5	2	1.6	5
	22i	1	2	3	3	3	5	5	6	6	6	6	NI	NI	11	4.2	5	6	2	1.8	5
	23a	4	5	5	5	5	5	5	6	6	6	6	NI	NI	11	5.3	5	5	1	1	3
	23i	3	4	4	5	5	5	5	6	6	6	6	NI	NI	11	4.9	5	6	1	1	3
	24a	3	4	4	4	4	4	5	5	5	6	6	NI	NI	11	4.6	4	4	1	0.9	3
	24i	3	4	4	5	5	5	5	5	6	6	6	NI	NI	11	4.9	5	5	1	0.9	3
	25a	1	5	5	5	5	6	6	6	6	6	6	NI	NI	11	5.2	6	6	2	1.5	5
	25i	2	3	4	5	5	6	6	6	6	6	6	NI	NI	11	5	6	6	1	1.4	4
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	26i	3	3	3	3	4	4	5	5	6	6	6	NI	NI	11	4.4	4	3	1	1.3	3
	27a	1	1	2	3	3	4	4	5	5	6	6	NI	NI	11	3.6	4	1	2	1.8	5
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SECTION 5	28a	1	1	2	2	2	2	3	3	3	4	4	NI	NI	11	2.5	2	2	1	1	3
	28i	1	1	2	2	3	4	4	4	4	5	6	NI	NI	11	3.3	4	4	2	1.6	5
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	29i	2	3	3	5	5	5	5	6	6	6	6	NI	NI	11	4.7	5	5	1	1.4	4
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	30i	1	4	4	4	4	5	5	5	6	6	6	NI	NI	11	4.6	5	4	1	1.4	5
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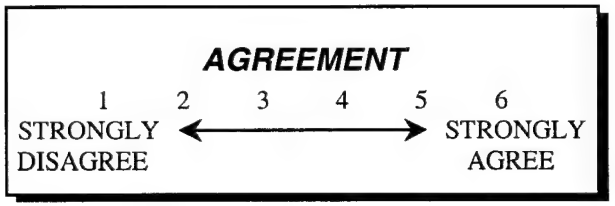
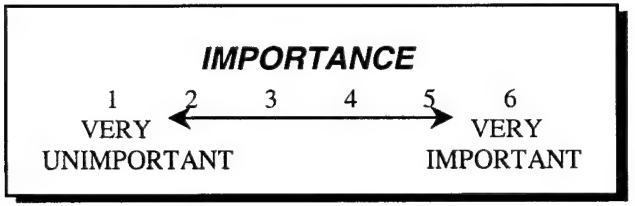
	31i	1	3	4	4	5	5	5	5	6	6	6	NI	NI	11	4.6	5	5	2	1.5	5
	32a	3	5	5	5	5	6	6	6	6	6	6	NI	NI	11	5.4	6	6	1	0.9	3
	32i	4	5	5	5	6	6	6	6	6	6	6	NI	NI	11	5.6	6	6	1	0.7	2
	33a	4	5	5	5	5	5	5	6	6	6	6	NI	NI	11	5.3	5	5	1	0.7	2
	33i	4	5	5	5	5	6	6	6	6	6	6	NI	NI	11	5.5	6	6	1	0.7	2

APPENDIX E – Survey Items That Achieved Consensus in Round One

SECTION #3 -- Survey Items That Have Achieved Consensus

STATEMENTS REGARDING DECISION PROCESS FLOW





	Your Choice Round 1		Group Mean	
	Agreement	Importance	Agreement	Importance
The statements below refer to the development of the decision flow and order of each decision identified in the decision process. Please indicate how much you agree or disagree with each statement and how important you feel it was for the item to be considered when developing the framework. Included below each question are comments from respondents received during Round One of the Survey				
9. The first process in selecting a KM project should be an analysis of corporate strategic goals to make a determination whether KM can provide the organization with a strategic advantage. Comments From Round One ♦ If the KM project is not directly linked to meeting a corporate strategic goal, it has no business even being contemplated.			4.9	5.0
10. Active, visible sponsorship by senior leadership needs to begin at the very first step of the KM evaluation and project selection process and continue through each step of the proposed KM project decision selection framework. Comments From Round One ♦ It is also essential to identify and garner strong support and active participation by the key stakeholders.			5.6	6.0

11. The organization's organizational structure and management philosophy are critical factors that must be addressed early in the KM project selection process because they can affect decisions made during each step of the process.			5.2	5.1
Comments From Round One ♦ And as part of this "consideration" you need to admit that changing the structure/philosophy might be require, both for the success of the project and (perhaps) for the viability of the organization ♦ The organization's structure needs to be taken into consideration early only to the extent of identifying key stakeholders. Other than that, org. structure impacts workflow and other development and implementation issues. Management philosophy, on the other hand, must be taken into consideration early because it impacts the organization's culture, and potential obstacles to the project's success, and readiness for change.				

STATEMENTS REGARDING IDENTIFICATION OF KEY DECISION VARIABLES

	Your Choice Round 1	Group Mean	
	Agreement	Agreement	Importance
The statements below refer to the identification of critical project variables that directly affect a knowledge management project's implementation and ultimate success. Please indicate how much you agree or disagree with each statement and how important you feel it was for the item to be considered when developing the framework.			

AGREEMENT

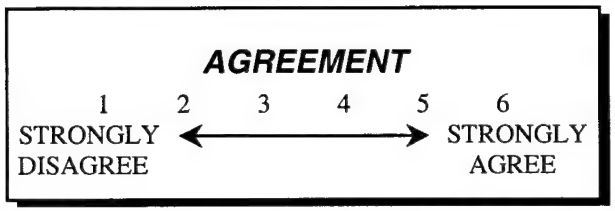
1 2 3 4 5 6
STRONGLY DISAGREE ⟷ STRONGLY AGREE

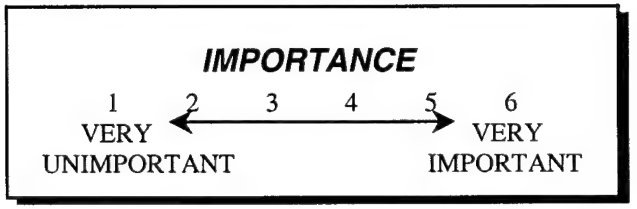
IMPORTANCE

1 2 3 4 5 6
VERY UNIMPORTANT ⟷ VERY IMPORTANT

14. To achieve the greatest measure of success across the entire organization, potential KM projects should focus on a key business process within the organization that directly supports the organization's strategic vision and goals. **Comments From Round One** ♦ A key business process may or may not be broken or provide a significant return on investment. The KM project should address the business process causing the most pain to the organization.			4.6	5.6
17. When identifying potential KM efforts, it is important to identify the potential impact the organization's culture will have on the acceptance and utilization of the KM project and how that impact will affect the successful implementation of the KM project. **Comments From Round One** ♦ It is important, but a countering view does not mean that you stop. If you have the support of the organizational leadership you might still proceed despite an organizational culture that resists, but you need to be real sure that the leadership supports you in that case, or you are being set up for failure. ♦ "If you build it, they will come." does not hold true for any IT product. If the product does not favorably answer the question, "What's in it for me?" from the perspective of the stakeholders and users, it will at best not be accepted and at worst, actively sabotaged. ♦ There are some cultures that are simply incompatible with the entire concept of KM... if the organization is not capable of evolving such a culture, the money would probably be better spent elsewhere. Where significant cultural change is necessary, the KM effort timeline for effectiveness may shift from a 3-5 year process to something much longer.			5.5	5.5
18. Part of identifying potential knowledge management efforts should include the development of clearly defined goals and measures of success that are directly tied to or support the organization's overall strategic vision and objectives. **Comments From Round One** Maybe. There are times (see #17 above) when deliberately fuzzy goals (fuzzy to the public, clear to the leadership) are required in order to overcome resistance. ♦ Absolutely. If it doesn't, don't waste your time. ♦ This is very important, but in the early stages the clearly defined goals may be more general than they will be as the project progresses. I'm not sure that many organizations can define exactly what they want KM to do in significant detail until they enter into the process and realize the potential.			5.3	5.5

STATEMENTS REGARDING SUCCESS FACTORS FOR PROJECT VARIABLES

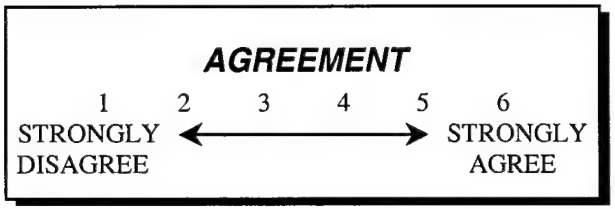


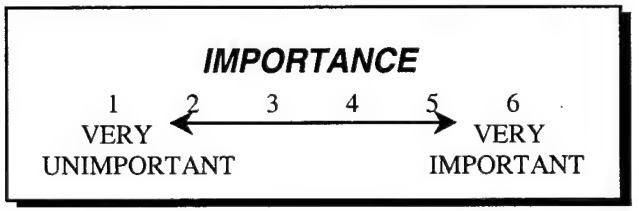


The statements below refer to the identification of success factors for project variables that directly affect a knowledge management project's implementation and ultimate success. Please indicate how much you agree or disagree with each statement and how important you feel it was for the item to be considered when developing the framework.

	Your Choice Round 1		Group Mean	
	Agreement	Importanc	Agreement	Importanc
23. For organizations to effectively transfer and utilize organizational best practices and lessons learned, both the explicit and the tacit knowledge associated with the best practice/lesson learned must be identified and transferred or made available to potential users.			5.3	5.0
24. The most effective way to transfer the context (tacit knowledge) underlying organizational processes that create and sustain organizational knowledge is through the use of communities of practice and knowledge pointers to tacit knowledge repositories. **Comments From Round One** Could add far more discussion here than the space will allow… COPs are only part of this picture.			4.5	4.9
25. Knowledge management projects designed to capture and codify organizational knowledge must have procedures in place to ensure the captured knowledge remains current and correctly reflects the organization's strategic goals and direction. Comments From Round One ♦ Knowledge may have historical value that has nothing to do directly with the organization's current strategic goals and direction			5.2	5.0

STATEMENTS REGARDING KNOWLEDGE MANAGEMENT THEORY





The statements below provided some of the theoretical foundation supporting this framework. Please indicate how much you agree or disagree with each statement and how important you feel it was for the item to be considered when developing the framework.

	Your Choice Round 1		Group Mean	
	Agreement	Importance	Agreement	Importance
30. KM projects designed to create new organizational knowledge add value to the organization by fostering inter-organizational collaboration and transfer of tacit knowledge, diffusing the organization's tacit knowledge throughout the organization. Comments From Round One ♦ This is particularly true for RDT&E organizations ♦ Creating cross functional teams has significant value… again, too much to fully explain this in this space, but feel free to contact me if you wish to discuss this more.			4.5	4.5
31. Organizations that see knowledge as a physical resource to be captured and managed instead of a dynamic process based upon human cognitive abilities will not achieve the full potential business advantages that are possible with knowledge management. Comments From Round One ♦ An organization must use all its intellectual (human, social, and structural) capital to its advantage. ♦ This is true but in current form irrelevant. Needs to be reduced to something actionable to have any value in a framework.			5.3	4.5

32. The primary focus of knowledge management is to enable the organization to share organizational knowledge throughout the organization for the purpose of making more informed decisions that will complement the organization's strategic goals. Comments From Round One ♦ Too fuzzy for me.....there are important operational objectives that can benefit from KM ♦ Knowledge shared is knowledge multiplied. And any IT projects, including KM, must support the organization's strategic goals. Need to modify this into two separate decision criteria however.			5.4	5.5
33. Knowledge management is not really about managing knowledge as a physical resource; rather it is about managing access to and utilization of existing organizational knowledge that resides within the organization to achieve the organizations strategic goals. **Comments From Round One** ♦ Correct as far as it goes. Knowledge needs to be managed just like the processes of the information life cycle. Created/gathered, stored, maintained, distributed... And it's not just organizational knowledge. The environment external to the organization often provides information and knowledge that is more important and relevant to the strategic success (survival) of the organization than internal information and knowledge.			5.3	5.5

Below are each participant's answers to why a framework is important and what constitutes a successful knowledge management project. Your answers are very insightful. They also are consistent with what I've seen during my research in both the commercial sector and the government sector regarding strategic planning, knowledge management, and enterprise-level projects for large organizations (at least for those organizations that have "successfully" utilized knowledge management within their organization).

Why is it important to have a framework identifying key decision variables that decision-makers should address when selecting a KM project?

♦ It is important to have at least an intuitive framework, a formal framework is important for many. KM is too new a concept to most and without a framework (intuitive or formal) some people would approach a KM project as a "feel good" exercise (and that is a waste of time).

♦ KM initiatives can be time consuming and costly. They must be targeted at critical activities that can make a difference in the organization's bottom line. Also, the pilot initiative needs to have a high success probability since you are using it as a catalyst for other process owners to adopt km.
♦ It is as important in selecting a KM project to have appropriate selection criteria based on agreed upon organizational vision, goals, and objects as it is to selecting the next generation tactical fighter aircraft. This is standard accepted practice when dealing with operational mission objectives and weapons acquisition programs. Unfortunately, it has not been the case in providing information technology and services.
♦ Every project needs planning. KM projects by their very nature involve many more varied factors than a typical project (since they usually touch not only a particular subject matter, but also organizational and personnel behaviors). The more complex the project the more important complete planning is. A good framework is a starting point to keep planning on track.
♦ Without some type of framework & needs analysis process to frame the intended KM effort, the possible KM related actions are simply too extensive and will likely lack the kind of focus/boundaries necessary for success.
♦ We have to know exactly what we have to do
♦ If you don't have a road map, any road will take you to a destination.
♦ A framework encourages the use of consistent criteria in developing requirements documents, business case, risk assessments, etc. to support competition for limited resources
♦ Encourages the use of consistent criteria in developing requirements documents, business case, risk assessments, etc., to support competition for limited resources.
♦ (2) Must be careful to ensure adherence to the framework does not stifle innovation and idea generation that may be outside the framework

A successful knowledge management project is one that ....
♦ increases the rate of innovation
♦ improves decision making

♦ provides a positive benefit-to-cost comparison
♦ fits into the agenda of the enterprise innovators
♦ is critical to meeting the organization's strategic objectives
♦ optimizes the use of its intellectual capital by helping an organization achieve its operational and/or strategic objectives
♦ enhances the organization's acquisition and use of knowledge with only acceptable and sustainable changes in effort by the organization's members
♦ isn't a project; it is a new way of thinking and acting to transfer explicit and tacit knowledge across time, space, and boundaries as part of the everyday business
♦ enhances individuals' ability to collaborate in a flexible manner to make the best use of the organization's intellectual capital in order to achieve organizational objectives
♦ properly balances people, the mission/processes, and technology to facilitate faster, better informed decisions; increase productivity; expand collaboration; and spark greater levels of creativity

APPENDIX F – Analysis of Statements Achieving Consensus in Round One

STATEMENTS ACHIEVING CONSENSUS IN ROUND 1

Question		A	B	C	D	E	F	G	H	I	J	K	Group Mean	Group Median	Range	*Std. Deviation	Consensus Achieved
9a	Agreement	1	4	4	5	5	5	6	6	6	6	6	4.9	5	5	2	YES
9i	Importance	1	4	5	5	5	5	6	6	6	6	6	5	5	5	2	YES
10a	Agreement	4	5	5	6	6	6	6	6	6	6	6	5.6	6	2	1	YES
10i	Importance	6	6	6	6	6	6	6	6	6	6	6	6	6	0	0	YES
11a	Agreement	4	4	4	5	5	5	6	6	6	6	6	5.2	5	2	1	YES
11i	Importance	4	4	4	4	5	5	6	6	6	6	6	5.1	5	2	1	YES
14a	Agreement	1	4	4	5	5	5	5	6	6	6	6	4.8	5	5	2	YES
14i	Importance	5	5	5	5	6	6	6	6	6	6	6	5.6	6	1	1	YES
17a	Agreement	4	5	5	5	6	6	6	6	6	6	6	5.5	6	2	1	YES
17i	Importance	4	4	5	5	6	6	6	6	6	6	6	5.5	6	2	1	YES
18a	Agreement	4	4	5	5	5	5	6	6	6	6	6	5.3	5	2	1	YES
18i	Importance	4	4	5	6	6	6	6	6	6	6	6	5.6	6	2	1	YES
23a	Agreement	4	5	5	5	5	5	5	6	6	6	6	5.3	5	3	1	YES
23i	Importance	3	4	4	5	5	5	5	6	6	6	6	4.9	5	3	1	YES
24a	Agreement	3	4	4	4	4	4	5	5	5	6	6	4.6	4	3	1	YES
24i	Importance	3	4	4	5	5	5	5	5	6	6	6	4.9	5	3	1	YES
25a	Agreement	1	5	5	5	5	6	6	6	6	6	6	5.2	6	5	2	YES
30i	Importance	1	4	4	4	4	5	5	5	6	6	6	4.6	5	5	1	YES
31a	Agreement	3	4	5	5	5	6	6	6	6	6	6	5.3	6	3	1	YES
32a	Agreement	3	5	5	5	5	6	6	6	6	6	6	5.4	6	3	1	YES
32i	Importance	4	5	5	5	6	6	6	6	6	6	6	5.6	6	2	1	YES
33a	Agreement	4	5	5	5	5	5	5	6	6	6	6	5.3	5	2	1	YES
33i	Importance	4	5	5	5	5	6	6	6	6	6	6	5.5	6	2	1	YES

*Fractional values rounded to nearest whole number

APPENDIX G - Round Two Questionnaire — Framework Evaluation

1. Please read the following instructions before filling out this questionnaire. This questionnaire is divided into 3 sections. The 1st section contains the framework evaluation questions (1 - 7) from Round One that did not achieve consensus. It also contains suggested modifications/additions that were provided by respondents in Round One. The 2nd section contains the rest of the questions from Round One (8 – 33) that did not achieve consensus. The 3rd section contains all questions from Round One that did achieve consensus.

2. Consensus in Round One for this Delphi Study was identified from the Round One results by applying the following measure:

3. 90% or more of all respondents inputs fall within +/- 1 standard deviation (SD) of the group mean (fractional SD's are rounded to the nearest whole number >/= 1). Also, of the remaining 10%, no more than one (1) response can have a conflicting overall opinion than the group response [i.e., all group responses but one fall within the 1-3 range (generally disagree) or 4-6 range (generally agree)].

4. The rating system for Round Two is the same as the rating system used in Round One. The rating system for the scaled questions ranges from a low of 1 to a high of 6. Each question includes your Round One response, the Group Mean response, and a place for you to record your Round Two response. If you wish to change your Round One response, please record your new response in the column labeled Round Two.

5. At the end of section 1, there is a list of all suggested modifications/additions to the initial framework. Please rate each suggestion based how much you agree that it should or should not be added to or used to modify the initial framework.

6. **Please fill out Section 1 first; I need this information to complete the Delphi Study on the initial framework.** Section 2 is also important for any future research regarding knowledge management in the Department of Defense (DOD). Your inputs will help provide a baseline that future researchers can use when initiating their research. A few additional minutes of your time to review your previous selection and either keep it or select a different response will allow me to apply the Delphi method to these questions as well. Section 3 is provided FYI only so that you may see what knowledge management issues your fellow DOD knowledge management practitioners/researchers are applicable to the DOD.

7. Please fill out "Participant Information" section below. Please save completed questionnaire as an MS Word document and e-mail back to me at william.bower@afit.af.mil. and CC: Billbower01@aol.com.

PARTICIPANT INFORMATION – Round Two

Participant Name _____

Participant Organization/Office Symbol_____

SECTION #1 – Framework Evaluation Statements

STATEMENTS REGARDING THE OVERALL FRAMEWORK

AGREEMENT

1 STRONGLY DISAGREE ← 2 3 4 5 → 6 STRONGLY AGREE

	Your Choice Round 1	Group Mean	Round 2 Agreement
1. It is important to have a framework identifying key decision variables that decision-makers should address when selecting a knowledge management (KM) project?		Consensus (4.9)	
2. This framework successfully captures the key decision-making processes that should occur when selecting and implementing a KM project?		**4.1**	
3. This framework accurately identifies the key decision-making processes that should occur when selecting and implementing a KM project? Comments From Round One ♦ Yes, but at a VERY BROAD level, there would clearly be a need for a much more detailed document to support what is involved with some of the elements of this process.		**4.1**	
4. This framework successfully identifies the order in which the decision-making processes should occur when selecting and implementing a KM project?		**4.3**	
5. This framework successfully identifies the key decision variables to be considered when selecting a KM project?		**4.4**	
6. This framework accurately identifies the individual key decision variables for each key decision-making process? **Comments From Round One** ♦ Note comments in question #2 below (*) ♦ Don't see the difference between Questions 5 and 6.		**4.3**	
7. Utilizing this framework will ensure the selected KM project will have a higher probability of success when implemented than if this framework were not utilized.		**4.5**	

Comments From Round One ♦ Any corporate decision made that is clearly and distinctly tied to the overall strategic objectives of the organization will have the highest degree of success. It will be defendable in competition for other corporate resources. ♦ This is too broad of a statement, simply using this framework will not ensure such success… that would be more directly related to how this framework is interpreted and used in each individual case. Again here part of the thought is that some pretty complex processes are briefly stated concepts that I am not sure all will fully understand without more detailed guidance.			

PROPOSED MODIFICATIONS RECOMMENDED TO INITIAL FRAMEWORK

Below are suggested modifications to the initial framework sent out in Round One. Each modification was suggested by one or more of the respondents in their Round One replies. Suggested modifications that were similar in nature were consolidated and are identified by the number of recipients who suggested the modification [i.e. (3)]. I included the comments as they were presented to eliminate any possible translation errors I might introduce. Please type the appropriate response in the column provided at right.	Agreement
1. Are there any processes would you include or delete from this framework? *there were 10 responses to this question	
♦ Add "Benchmark Best Practices" at step 2 or 3 of the framework	
♦ Organizational Culture needs to be emphasized more	
♦ (2) Include an ethnographic analysis as part of the organizational culture assessment (to include domain analysis, taxonomic analysis, and componential analysis). This will not be a small project, but is critical to success.	
♦ We have to define the outcome(s) we want to achieve. (one suggestion is ROI)	
♦ Need to define Performance Measure Metrics (in framework—Key Factor affecting decision process for step #4)	

♦ Knowledge management is currently viewed as an emerging discipline that combines change, intellectual capital, and information technology. Suggest framework cover al those bases.	
♦ References are exclusive to "organizational knowledge" which limits the entire focus to internal knowledge, excluding external knowledge or scanning the external environment for knowledge of potential value to the organization. Knowledge which is external to the organization is critical to the research, development, test, and evaluation mission, and is even more critical to the intelligence mission.	
♦ *The framework should incorporate the development of a tactical/business plan to link project milestones and near-term priorities & objectives to the organization's long-range strategic goals and objectives. - It is also important to address priorities in the framework. The framework lists knowledge vision and strategy and then corporate strategic objectives. The framework should visibly demonstrate that every other corporate decision must flow from the organization's mission, vision, and strategy. Listed first, it then becomes apparent that knowledge, one of the corporate assets or resources that can be applied along with labor, capital, equipment, facilities, and materials, will be managed to meet the organization's mission, vision, and strategy. And as those vary, in these times of constant change, so must knowledge management strategy change. Following from a strategic plan is a tactical or business plan, what will the organization do in the next 12 months to meet the objectives and timelines of the strategic plan. Now the framework can begin to clearly define project selection criteria, what do we do and how do we do it, that supports the priorities of the organization's overall strategic plan. This link is crucial. When the KM project directly supports already agreed upon strategic objectives with milestones that also coincide, then the KM project is tied to the strategic success of the organization. Subsequent financial, personnel, acquisition, and logistics support plans for the KM project will be approved and supported without opposition. Without this link, the KM project is doomed to the first budget cut drill. * I underlined what I understood to be the proposed modification and summarized my understanding of it above	
♦ The very first phase of this framework jumps into "Knowledge" Strategy, Future "Knowledge" Requirements, etc. – this phase should focus primarily on the Business Strategy, goals, objectives, etc.. Business needs need to drive KM efforts, KM is nothing more than a means to facilitate faster, better informed (business) decisions. Also, beyond Senior Leader "Interest" one of the most important links to ensure a successful KM effort is actual Senior Leader "INVOLVEMENT."	
2. Are there any changes you would make to the order in which the decisions occur? *there were 3 responses to this question	

♦ The thought that keeps coming to me is "when is the proper time for what is now step #5" (ident success factors) ? I really see that as certainly overlapping #4 and in many cases precedes #4. In selling any new idea (your KM project) you always have to design for successful support issues and design around (or to overcome) failure criteria.	
♦ The framework should visibly demonstrate that every other corporate decision must flow from the organization's mission, vision, and strategy. Listed first, it then becomes apparent that knowledge, one of the corporate assets or resources that can be applied along with labor, capital, equipment, facilities, and materials, will be managed to meet the organization's mission, vision, and strategy	
♦ There should be flexibility built into the order the decisions occur. There are instances where some factors in step 5 would need to be addressed at an earlier time or in conjunction with one or more other steps (*my understanding of the intent of the comment below) - * I have spent a lot of time looking at this one and am not entirely confident that some of the elements within the last box should not take place earlier in the process… what is the projected time-frame that you envision the entire above process taking? Perhaps if the processes are taking place in relative close proximity to each other, splitting hairs over what should happen in which process is not quite as important.	
3. Are there any decision variable s you feel are missing or are extraneous? *there were 10 responses to this question	
♦ (3) Team Selection. I do not believe a knowledge management team should consist of IT folks exclusively or volunteers. One must have the right people. ♦ Identification of key personnel within the organization who may be uniquely suited to help or hinder the project. - Finding those who can help mold and sell (market) the project is obvious. But finding those who can easily derail the project is at least as important. A few bad words from the right individual(s) can be extremely difficult to overcome.	
♦ Need to define who the customers are.	

♦ Could ask explicitly if knowledge management is already being done but just not being recognized and called as such (i.e. brown bag "lessons learned" sessions, formal/informal mentoring relationships); if so, what can be done to institutionalize, expand, and improve the sharing of knowledge across communities.	
♦ Supporting "infostructucture" and change catalysts such as policies, education and training interventions, and governance issues need to be considered.	
♦ You mention "budget constraints" but I would like to see a more explicit cost-to-benefit consideration factor.	
♦ It is also important to identify key stakeholders in the affected process and what their views are. An assessment should be made to determine whether or not the organization is ready for change and if not, what needs to be done to make it ready for change, i.e., making the change is critical to the survival of the organization and the key stakeholders involved.	
♦ Technology is clearly not necessarily the most important thing, but perhaps the framework should include decision variables related to determining the appropriate type of technology necessary to accomplish the KM objective.	
♦ The framework is confusing. There are 5 sets of decision factors and really only 4 questions (albeit 5 tasks) I don't think they always correlate too well. Also, it mixes apples and oranges. ID & Map Tacit and Explicit Knowledge repositories (#5) is a whole new process or task....not a key decision making factor. * My understanding is that suggested modifications would include rephrasing above to "Identify factors associated with ID & Map Tacit and Explicit Knowledge repositories (can it be done, is it feasible, what are the costs vs. benefits, how does it fit into overall corporate strategy, etc.). Regarding balancing tasks to decision factors, the 1st unspoken decision process would be to initiate the 1st step of the framework. I would welcome any additional inputs on how to further define this suggestion.	

APPENDIX H – Analysis of Delphi Responses Regarding Framework Evaluation

FRAMEWORK CONSENSUS RATINGS

Question		AF	AF	OTHER	OTHER	OTHER	OTHER	AF	AF	AF	AF	AF	AF	OTHER	OTHER	*Group Mean	Group Median	Range	*Std. Deviation	Consensus Achieved	Opinion Stability	
																					% Change	Stability Achieved
1	Round 1	6	5	4	4	5	4	4	6	5	4	6	6	5	5	5	5	2	1			
	Round 2	6	5	4	5	5	4	4	6	5	4	6	X	X	5	5	5	2	1			
	Chg				1															YES	4%	YES
2	Round 1	5	5	3	3	3	3	5	4	5	4	5	5	5	3	4	4	2	1			
	Round 2	5	5	3	3	3	3	5	4	5	4	5	X	X	3	4	4	2	1			
	Chg																			NO	0%	YES
3	Round 1	5	5	3	3	3	3	5	4	5	4	5	5	4	4	4	4	2	1			
	Round 2	5	4	3	3	3	3	5	4	5	4	5	X	X	4	4	4	2	1			
	Chg		1																	NO	4%	YES
4	Round 1	6	5	3	3	3	3	5	4	5	4	5	5	4	4	4	4	3	1			
	Round 2	5	5	3	3	3	3	5	4	5	4	5	X	X	4	4	4	2	1			
	Chg	1																		NO	4%	YES
5	Round 1	6	5	4	4	3	4	5	4	5	4	5	5	3	5	4	4	3	1			
	Round 2	5	5	4	4	3	4	5	4	5	4	5	X	X	5	4	4.5	2	1			
	Chg	1																		YES	4%	YES
6	Round 1	5	5	4	4	4	4	5	X	4	3	5	5	3	5	4	4.5	2	1			
	Round 2	5	5	4	4	4	4	5	4	4	3	5	X	X	5	4	4	2	1			
	Chg																			YES	0%	YES
7	Round 1	6	6	3	3	3	3	6	6	5	3	6	4	5	4	4	4	3	1			
	Round 2	5	5	3	4	3	3	5	6	5	3	6	X	X	4	4	4.5	3	1			
	Chg	1	1		1			1												NO	16%	NO

X = no input that round

*Fractional values rounded to nearest whole number

APPENDIX I – Round Two Questionnaire – KM Theory

1. Please read the following instructions before filling out this questionnaire. This questionnaire is divided into 3 sections. The 1st section contains the framework evaluation questions (1 - 7) from Round One that did not achieve consensus. It also contains suggested modifications/additions that were provided by respondents in Round One. The 2nd section contains the rest of the questions from Round One (8 – 33) that did not achieve consensus. The 3rd section contains all questions from Round One that did achieve consensus.

2. Consensus in Round One for this Delphi Study was identified from the Round One results by applying the following measure:

3. 90% or more of all respondents inputs fall within +/- 1 standard deviation (SD) of the group mean (fractional SD's are rounded to the nearest whole number >/= 1). Also, of the remaining 10%, no more than one (1) response may disagree/conflict with the rest of the groups responses [i.e., all group responses except one (maximum) fall within the 1-3 range (generally disagree) or 4-6 range (generally agree)].

4. The rating system for Round Two is the same as the rating system used in Round One. The rating system for the scaled questions ranges from a low of 1 to a high of 6. Each question includes your Round One response, the Group Mean response, and a place for you to record your Round Two response. If you wish to change your Round One response, please record your new response in the column labeled Round Two.

5. At the end of section 1, there is a list of all suggested modifications/additions to the initial framework. Please rate each suggestion based how much you agree that it should or should not be added to or used to modify the initial framework.

6. Please fill out section 1 first; I need this information to complete the Delphi Study on the initial framework. Section 2 is also important for any future research regarding knowledge management in the Department of Defense (DOD). Your inputs will help provide a baseline that future researchers can use when initiating their research. Section 3 is provided FYI only so that you may see what knowledge management issues your fellow DOD knowledge management practitioners/researchers are applicable to the DOD.

7. Please fill out "Participant Information" section below. Please save completed questionnaire as an MS Word document and e-mail back to me at william.bower@afit.af.mil.

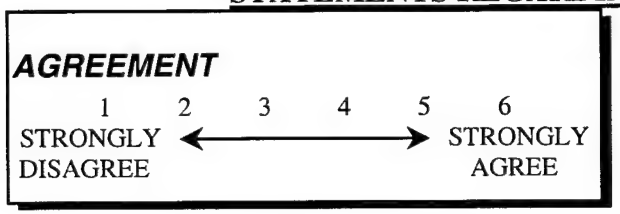
PARTICIPANT INFORMATION – Round Two

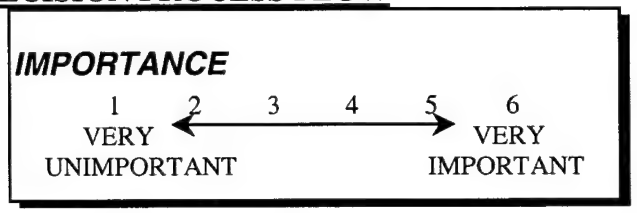
Participant Name _____

Participant Organization/Office Symbol_____

SECTION #2 -- Survey Items For Which Consensus Has Not Yet Been Achieved

STATEMENTS REGARDING DECISION PROCESS FLOW





The statements below refer to the development of the decision flow and order of each decision identified in the decision process. Please indicate how much you agree or disagree with each statement and how important you feel it was for the item to be considered when developing the framework. Included below each question are comments from respondents received during Round One of the Survey

	Your Choice Round 1		Group Mean		Round 2 Mark Desired Changes	
	Agreement	Importance	Agreement	Importance	Agreement	Importance
34. An organization should establish a corporate knowledge vision and knowledge strategy before an analysis of corporate strategic objectives (SWOT – strengths, weaknesses, opportunities, threats) can be performed.			3.5	4.7		
Comments From Round One ♦ (2) A SWOT can be done anytime anywhere, across the entire organization or at department level. Objectives and strategies are developed as a result of the SWOT analysis, which show the gaps between where you are and where you want to be. To develop strategies before this may lead to wrong strategies. ♦ Corporate strategic objectives flow from the corporate mission and vision. One method of developing the strategic objectives is SWOT analysis. The corporate knowledge vision and strategy flow from the corporate strategic plan, not the other way around.						
12. Prior to identifying KM project variables affecting project implementation success, definitions of key terms should be agreed upon in advance so that everyone has a clear understanding of the KM project's intended purpose.			4.9	4.8		

Comments From Round One

- (2) This is the importance of the taxonomic analysis
- I'd hedge on this one – sometimes you let the misunderstanding exist at the start but with the understanding that people will come to a common understanding only through the pursuit of the KM project.
- It goes without saying that all those involved with a project have to speak the same language. What is even more critical, however, and not clearly addressed in this question or the framework, is the need to manage expectations.
- If you would have stated everything here except the part about "...key terms..." I would have rated this a "6," because what is really important is start with a clear understanding of the KM project's intended purpose (I think you are trying to combine two different questions into one, and it does not work here).

*my intent here was the need to identify a common taxonomy so everyone is reading from the same page (so to speak)

13. An organization's corporate knowledge vision and knowledge strategy are the primary guidance for identification, development, and implementation of all KM projects undertaken throughout the organization to ensure each KM project's goals are consistent with organizational objectives.

		4.5	5.2		

Comments From Round One

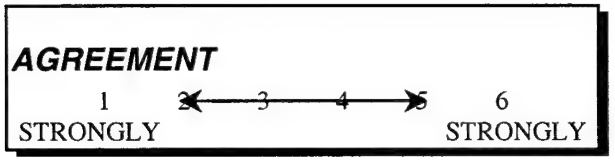
- Yes! Assuming that the knowledge vision and strategy derive directly from the corporate vision and strategy.

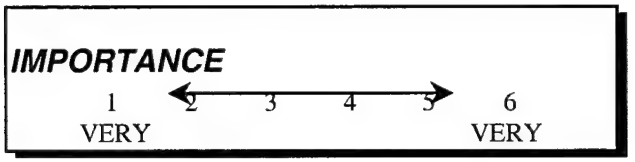
General Decision Process Flow Section Comments From Round One

- A new KM effort may fundamentally change the vision of the organization -- grounding your KM efforts in the existing vision may limit your future efforts and directions
- Most organizations we have dealt with have not developed a km strategy. In fact, the degree of success of the pilot may be what actually makes the organization develop such a strategy.
- The organization's corporate K vision and strategy are critical success factors.
- The organization's corporate/enterprise vision and strategy are critical to any effort undertaken, and occurs outside of the KM framework; there should be no separate "knowledge vision" or "knowledge strategy." Knowledge management of some sort is essential to achieving the organization's objectives, whether it is labeled KM or not. In fact, labeling something as a KM effort is likely to make it seem to be something outside of the organization's primary mission (the way some people saw TQM), and may delay institutionalizing the practice of sharing knowledge effectively and efficiently.
- KM efforts should focus on people, processes, *and the knowledge or information needed to achieve desired outcomes*, as opposed to technology. Some knowledge work does not lend itself to repeatable processes, but would benefit from a KM infrastructure that encourages interaction and *ad hoc* sharing of information. GPRA and ITMRA promote focusing on operational outcomes, as opposed to processes; process improvement generates efficiency only if the process is needed in the first place. That's why it's necessary to identify performance measures for objectives before trying to improve processes.

Comments for Round Two:

STATEMENTS REGARDING IDENTIFICATION OF KEY DECISION VARIABLES





The statements below refer to the identification of critical project variables that directly affect a knowledge management project's implementation and ultimate success. Please indicate how much you agree or disagree with each statement and how important you feel it was for the item to be considered when developing the framework.

	Your Choice Round 1		Group Mean		Round 2 Mark Desired Changes	
	Agreement	Importance	Agreement	Importance	Agreement	Importance
15. The strategic goal of KM projects that reuse existing organizational knowledge (vs. creating new knowledge) is to streamline and enhance the organization's standard operating procedures and business methods by taking advantage of methods that have proven to be successful.			3.8	3.9		

Comments From Round One

- The goal of the KM project might more appropriately be to share the knowledge generated by a perfectly well run business process.
- I am not sure this question is worded properly, the last phrase of it is far too bold of a leap. The strategic goal of any KM project should be an attempt to enable faster, better informed decisions. Technology creates a means by which we now can centralize access to stovepipe data; potentially serves as a means by which to identify conflicting information available in different organizational sources; and, can provide a different way of thinking about how knowledge is collected & stored to hopefully demonstrate the value of replacing stovepipe system with integrated systems at the end of the lifecycles of existing systems.

* Harvard Business Review Article, "What's Your Strategy for Managing Knowledge (Mar-Apr 99) was the impetus for #15. Focus was on ID'ing type of knowledge you want to manage & the potential implications to your implementation strategy.

16. An organization's structure (flying wing vs. research lab, centralized vs. geographically separated), combined with the organization's knowledge strategy, should affect the selection and implementation strategy of a KM project. **Comments From Round One** ♦ See previous comments regarding importance of organizational structure. Strategy is important to the selection. Organizational structure is primarily important to implementation. ♦ Organizational structure is important for cultural considerations; but strategic goals & objectives should be the primary driving factor in designing a system. Organization structure is "a" consideration, not "the" consideration. Perhaps a better way to describe this is that organizational structure may determine the "how," whereas strategic goals and objectives should determine the "what & why."			4.2	4.5		
19. KM projects designed to capture, codify, and utilize an organization's existing organizational knowledge should restructure employee compensation procedures to encourage and reward employee participation. **Comments From Round One** ♦ While it is important, or critical, to the project's success to answer the customer's "What's in it for me?" question, the answer does not necessarily need to be more money in my pocket. Just making life easier for the customer, or providing more personal recognition, may be sufficient. ♦ If we are talking about trying to influence collaboration by directly paying for it, I would rate this a "3"; however, if we are talking about the bigger picture of incorporating this into performance standards and reviews, thus ultimately affecting the promotion and bonus process, I would consider this to be a "6." * I was referring to the latter (above) as a way of institutionalizing participation into organizational culture			4.2	4.0		
20. Organizational knowledge provides its greatest value to the organization when it is transferred from knowledge holders to knowledge users in a timely manner and with enough supplemental information (context) so that the existing knowledge can be applied to the knowledge user's current situation. **Comments From Round One** ♦ The goal of any KM effort should ultimately relate to faster, better informed decision making			4.9	4.8		

General Key Decision Variable Comments From Round One

- I think that an organization's strategic intent is important, you need to know where they are going; however, the biggest bang may be in a critical process that is not being altered in a strategic sense but affects the productivity of people day in and day out. Also, in selecting a pilot, you probably won't go after the compensation procedures on the first round. That probably represents more effort than the initiative.
- Organizational structure and geographic location are less important than the type of work being done by the individual. Since all workers are knowledge workers in some (if not all) of their roles, all have the potential to benefit from a flexible KM infrastructure. As with the telephone system, you don't need to know who needs to talk to whom, when, for how long, or about what, in order to justify having the infrastructure available for use as needed.
- Organizational culture will evolve with the right incentives -- which may be intangible compensation (e.g., recognition), versus financial -- and with the passage of time, as those who don't adapt elect to depart.

Often organizational structure has to be changed due to reengineered business processes. It is about paradigm shift.

Comments for Round Two:

STATEMENTS REGARDING SUCCESS FACTORS FOR PROJECT VARIABLES

AGREEMENT

1 2 3 4 5 6
STRONGLY STRONGLY

IMPORTANCE

1 2 3 4 5 6
VERY VERY

Round 2 Mark Desired Changes		Group Mean		Your Choice Round 1	
Agreement	Importance	Agreement	Importance	Agreement	Importance

The statements below refer to the identification of success factors for project variables that directly affect a knowledge management project's implementation and ultimate success. Please indicate how much you agree or disagree with each statement and how important you feel it was for the item to be considered when developing the framework.

21. A military organization's tacit organizational knowledge, residing primarily within informal communities of practice, forms the core of that organization's distinctive competence. Comments From Round One ♦ I don't think we should consider tacit knowledge to reside in communities but rather within individuals. From that perspective communities can be seen as only one way to optimize the use of our intellectual capital. We may just want to connect a process user to the right expert in an area, and that's not a community ♦ If I understand what I think you're trying to say, an organization's strength, to a large degree, rests on the "know how" of their people, then I agree. But I guess this is only important in identifying who your subject matter experts are, at any given time. ♦ In many ways, the military has perhaps a better grasp on KM than private industry… a great deal is captured in SOPs, OPORDS, ARTEP Standards, CCIR, and the list goes on.			4.5	4.7		
22. Tacit knowledge residing within organizational members loses much of its unique value when it is captured and stored in a organizational knowledge database because the knowledge loses its dynamic component and becomes static when stored. **Comments From Round One** ♦ Only to the degree that the knowledge itself is dynamic or fleeting. The value of knowledge is determined by the critical nature of the question it is used to answer and not on whether or not it's written down. ♦ If done properly, this is not an accurate statement. A big current shortfall is the lack of effective planning to leverage lessons learned/proven practices… much could be effectively be captured; but, how we plan to use it is the challenge.			4.0	4.2		
26. Knowledge management projects designed to capture and codify organizational knowledge must have procedures in place to ensure the captured knowledge remains current and correctly reflects the organization's strategic goals and direction. Comments From Round One ♦ Knowledge may have historical value that has nothing to do directly with the organization's current strategic goals and direction			5.2	5.0	Consensus	

26. Although a KM project can both reuse existing organizational knowledge and create new organizational knowledge, the project goals should clearly identify the overall focus of the KM project; reusing existing knowledge or creating new knowledge. **Comments From Round One** ♦ The project goal should be to integrate the appropriate balance of both of these things.			4.6	4.4		
27. Two common types of knowledge distribution strategies are push strategies and pull strategies. Of these two types, the pull strategy is the most effective method of providing the right knowledge to the right person at the right time. **Comments From Round One** ♦ You need the flexibility in your architecture for both. If I know what I need, it's certainly more effective for me to pull what I need, and only what I need, when I need it, and in the form I need it. But if I know you need something but you don't know you need it, I need to be able to push it to you. Bottom line: You need both push and pull. And while we're on the subject of delivery, you also need to aggregate or collect knowledge objects relating to a project or a work-group. This would be analogous to the old office bookcase and work table. ♦ Today, this is an accurate statement; however, the technology necessary to push content in context is getting much better. The mark on the wall should be customization to every organization & individual, providing content in context; until we do this, KM systems are still in their infancy.			3.6	4.0		

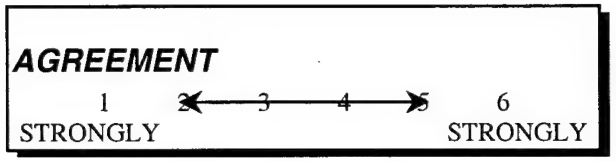
General Comments Regarding Success Factors For Project Variables From Round One

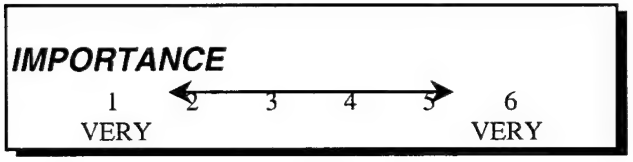
- "Making tacit knowledge available" includes providing opportunities for individuals to communicate across geographic, time, and organizational boundaries with other individuals they may not even know exist. (See comment in Key Decision Variables Section about the need for a flexible KM infrastructure.)
- Again, I'm uncomfortable with the "KM project" approach. The need to reuse existing or create new knowledge may drive the selection of one technical solution over another, but a knowledge-based organization must be able to do both in order to succeed.

Most of valuable knowledge is tacit knowledge, tacit knowledge is up-to-date knowledge.

Comments for Round Two:

STATEMENTS REGARDING KNOWLEDGE MANAGEMENT THEORY





The statements below provided some of the theoretical foundation supporting this framework. Please indicate how much you agree or disagree with each statement and how important you feel it was for the item to be considered when developing the framework.

	Your Choice Round 1		Group Mean		Round 2 Mark Desired Changes	
	Agreement	Importance	Agreement	Importance	Agreement	Importance
28. The greatest barrier to transferring Best Practices and Lessons Learned within an organization is the lack of absorptive capacity of the potential recipients of the knowledge. ("absorptive capacity" is defined as the ability of a knowledge recipient to evaluate, assimilate, and apply new knowledge successfully to a particular situations)			2.5	3.3		

Comments From Round One

- Greatest barrier is an individual's reluctance to share their prized knowledge. Knowledge is power, self -promotional, I worked for my knowledge and you should work just as hard to gain the same knowledge etc.
- One of the barriers is the culture
- Greatest barrier is the lack of an effective process to leverage lessons learned/proven practices. Ford is a great example of a way to do this right, if you are looking for positive examples.
- So you're saying the biggest barrier to effectively using knowledge is the intellectual limitations of our personnel. I certainly don't want to propose that anywhere.

* [My intent here was to say that each person has limits on the amount of info. they can efficiently evaluate, assimilate, and apply (i.e.. convert inf. into knowledge). This concept would impact how info. is captured, categorized, stored, and presented to limit overload and maximize utilization (capture context, pull vs. push, repositories vs. COPs & pointers)]

32. KM projects designed to capture and share an organization's best business practices/lessons learned add value to the organization by enabling users to make more informed business decisions and by incorporating these practices into the organization's standard operating procedures to make business processes more efficient. Comments From Round One ♦ Add "to make better decision" ♦ This is true as far as it goes. "Standardizing" can certainly be more efficient, but not necessarily more effective. I certainly want to capture the wisdom of my gray beards, but I don't want standardizing to stagnate growth, as tends to be the case in a bureaucracy, or to stifle innovation.			**4.6**	**4.7**		
33. KM projects designed to create new organizational knowledge add value to the organization by fostering inter-organizational collaboration and transfer of tacit knowledge, diffusing the organization's tacit knowledge throughout the organization. Comments From Round One ♦ This is particularly true for RDT&E organizations ♦ Creating cross functional teams has significant value… again, too much to fully explain this in this space, but feel free to contact me if you wish to discuss this more.			**4.5**	**4.5**		Consensus
34. Organizations that see knowledge as a physical resource to be captured and managed instead of a dynamic process based upon human cognitive abilities will not achieve the full potential business advantages that are possible with knowledge management. Comments From Round One ♦ An organization must use all its intellectual (human, social, and structural) capital to its advantage. ♦ This is true but in current form irrelevant. Needs to be reduced to something actionable to have any value in a framework.			**5.3**	**4.5**	Consensus	

Comments From Round One

- I think that organizations needs to look at all aspects of optimizing their intellectual capital…connecting and collecting……..the approach should be balanced
- I believe that individuals and organizations may be resistant to using lessons learned or best practices because they typically do not fit the situation at hand. Not sure if KM can resolve this fundamentally "infinite" problem or whether KM can be proven to narrow the gap.

Comments for Round Two:

APPENDIX J – Analysis of Delphi Responses to KM Theory

THEORY STATEMENTS CONSENSUS RATINGS

(Statements that did not achieve consensus in round 1)

Question		AF	AF	OTHER	OTHER	OTHER	OTHER	AF	AF	AF	AF	AF	AF	OTHER	OTHER	*Group Mean	Group Median	Range	*Std. Deviation	Consensus Achieved	Opinion Stability	
																					% Change	Stability Achieved
8a	Round 1	6	3	X	X	6	5	4	1	5	1	4	5	2	1	4	4	5	2			
	Round 2	6	4	X	X	6	X	4	1	5	1	4	X	X	X	4	4	5	2			
	Chg		1																	NO	6%	YES
8i	Round 1	6	3	X	X	6	5	4	X	5	6	4	5	3	X	5	5	3	1			
	Round 2	6	4	X	X	6	X	4	6	5	6	4	X	X	X	5	5.5	2	1			
	Chg		1																	YES	6%	YES
12a	Round 1	6	6	X	X	5	5	4	6	4	6	5	5	3	3	5	5	3	1			
	Round 2	6	5	X	X	5	X	4	6	4	6	5	X	X	X	5	5	2	1			
	Chg																			YES	0%	YES
12i	Round 1	5	6	X	X	5	5	4	6	5	6	5	5	3	3	5	5	3	1			
	Round 2	5	5	X	X	5	X	4	6	5	6	5	X	X	X	5	5	2	1			
	Chg		1																	YES	6%	YES
13a	Round 1	6	6	X	X	5	4	4	6	5	1	5	5	2	6	5	5	5	2			
	Round 2	6	5	X	X	5	X	4	6	5	1	5	X	X	X	5	5	5	2			
	Chg		1																	YES	6%	YES
13i	Round 1	6	6	X	X	5	4	4	6	5	6	5	6	3	6	5	6	3	1			
	Round 2	6	5	X	X	5	X	5	6	5	6	5	X	X	X	5	5	1	1			
	Chg		1					1												YES	13%	YES
15a	Round 1	6	5	X	X	3	3	5	1	4	4	5	6	3	1	4	4	5	2			
	Round 2	6	5	X	X	3	X	5	1	4	4	5	X	X	X	4	4.5	5	2			
	Chg																			NO	0%	YES
15i	Round 1	6	5	X	X	2	4	5	1	4	4	6	6	3	1	4	4	5	2			
	Round 2	6	5	X	X	2	X	5	1	4	4	6	X	X	X	4	4.5	5	2			
	Chg																			NO	0%	YES
16a	Round 1	3	5	X	X	4	3	6	2	5	4	5	6	4	4	4	4	4	1			
	Round 2	5	4	X	X	4	X	5	2	5	4	5	X	X	X	4	4.5	3	1			
	Chg	2	1					1												YES	31%	NO
16i	Round 1	6	5	X	X	3	4	5	3	5	3	5	6	5	4	5	5	3	1			
	Round 2	5	4	X	X	3	X	5	3	5	3	5	X	X	X	4	4.5	2	1			
	Chg		1																	NO	6%	YES
19a	Round 1	6	5	X	X	4	4	3	3	3	5	6	2	2	6	4	4	4	2			
	Round 2	6	4	X	X	4	X	2	3	3	5	6	X	X	X	4	4	4	1			
	Chg		1					1												NO	13%	YES
19i	Round 1	6	5	X	X	2	4	3	5	3	4	6	1	2	6	4	4	5	2			
	Round 2	6	4	X	X	2	X	2	5	3	4	6	X	X	X	4	4	4	2			
	Chg		1					1												NO	13%	YES
20a	Round 1	6	6	X	X	2	5	6	3	6	5	5	6	4	6	5	5	4	1			
	Round 2	6	5	X	X	2	X	6	3	6	5	5	X	X	X	5	5	4	1			
	Chg		1																	NO	6%	YES
20i	Round 1	6	6	X	X	3	5	5	3	6	4	5	6	4	6	5	5	3	1			
	Round 2	6	5	X	X	3	X	6	3	6	4	5	X	X	X	5	5	3	1			
	Chg							1												NO	6%	YES
21a	Round 1	6	5	X	X	3	5	4	6	6	4	4	5	4	3	5	4	3	1			
	Round 2	5	5	X	X	3	X	5	6	6	4	4	X	X	X	5	5	3	1			
	Chg							1												YES	6%	YES
21i	Round 1	6	5	X	X	3	6	4	4	5	6	4	6	5	3	5	5	3	1			
	Round 2	5	5	X	X	3	X	4	4	5	6	4	X	X	X	5	4.5	3	1			
	Chg	1																		YES	6%	YES

X = no input that round

*Fractional values rounded to nearest whole number

Question		AF	AF	OTHER	OTHER	OTHER	OTHER	AF	AF	AF	AF	AF	AF	OTHER	OTHER	*Group Mean	Group Median	Range	*Std. Deviation	Consensus Achieved	Opinion Stability	
																					% Change	Stability Achieved
	Round 1	6	2	X	X	5	6	3	1	2	5	5	4	4	3	4	4	5	2			
	Round 2	6	3	X	X	5	X	3	1	2	5	5	X	X	X	4	4	5	2			
22a	*Chg*		1																	NO	6%	YES
	Round 1	6	2	X	X	3	6	3	1	6	6	5	6	5	3	4	5	5	2			
	Round 2	5	3	X	X	3	X	3	1	6	6	5	X	X	X	4	4	5	2			
22i	*Chg*																			NO	0%	YES
	Round 1	6	6	X	X	5	3	6	2	6	6	5	6	4	6	5	6	4	1			
	Round 2	6	5	X	X	5	X	6	2	6	6	5	X	X	X	5	5.5	4	1			
25i	*Chg*		1																	YES	6%	YES
	Round 1	6	5	X	X	5	5	3	6	6	4	5	6	5	1	5	5	5	2			
	Round 2	5	5	X	X	5	X	4	6	6	4	5	X	X	X	5	5	2	1			
26a	*Chg*	1						1												YES	13%	YES
	Round 1	6	5	X	X	4	4	3	3	6	3	5	6	3	6	4	4	3	1			
	Round 2	5	5	X	X	4	X	4	3	6	3	5	X	X	X	4	4.5	3	1			
26i	*Chg*	1						1												NO	13%	YES
	Round 1	6	4	X	X	5	5	3	1	3	2	4	1	6	3	4	4	5	2			
	Round 2	4	4	X	X	5	X	3	1	3	2	4	X	X	X	3	3.5	4	1			
27a	*Chg*	2																		NO	13%	YES
	Round 1	6	4	X	X	4	4	6	1	6	5	4	5	5	3	4	4	5	1			
	Round 2	4	4	X	X	4	X	4	1	6	5	4	X	X	X	4	4	5	1			
27i	*Chg*	2						2												YES	25%	NO
	Round 1	4	2	X	X	4	3	2	1	4	2	2	3	3	1	3	2	3	1			
	Round 2	3	2	X	X	4	X	2	1	4	2	2	X	X	X	3	2	3	1			
28a	*Chg*	1																		NO	6%	YES
	Round 1	6	2	X	X	4	4	2	1	6	4	5	4	3	1	3	4	5	2			
	Round 2	4	2	X	X	4	X	2	1	6	4	5	X	X	X	3	3.5	5	2			
28i	*Chg*	2																		NO	13%	YES
	Round 1	5	5	X	X	4	5	4	5	5	3	5	5	4	6	5	5	3	1			
	Round 2	5	5	X	X	4	X	5	5	5	3	5	X	X	X	5	5	2	1			
29a	*Chg*							1												YES	6%	YES
	Round 1	6	5	X	X	2	5	6	3	5	3	6	5	5	6	5	5	4	1			
	Round 2	6	5	X	X	4	X	6	3	5	3	6	X	X	X	5	5	3	1			
29i	*Chg*					2														NO	13%	YES
	Round 1	6	5	X	X	4	5	4	6	5	4	5	2	3	6	5	5	4	1			
	Round 2	6	5	X	X	4	X	4	6	5	4	5	X	X	X	5	5	2	1			
30a	*Chg*																			YES	0%	YES
	Round 1	6	4	X	X	4	6	5	1	5	6	5	5	5	3	5	5	5	2			
	Round 2	6	4	X	X	5	X	5	1	5	6	5	X	X	X	5	5	5	2			
31i	*Chg*					1														YES	6%	YES

X = no input that round

*Fractional values rounded to nearest whole number

Appendix K – Analysis of Proposed Modifications to Framework

PROPOSED FRAMEWORK MODIFICATIONS
CONSENSUS RATINGS

Question		A	B	C	D	E	F	*Group Mean	Group Median	Range	*Std. Deviation	Consensus Achieved
1	A	2	3	4	4	5	6	4	4	4	1	
	B	4	4	5	5	5	6	5	5	2	1	YES
	C	2	3	3	4	5	5	4	3.5	3	1	
	D	2	4	5	5	5	5	4	5	3	1	
	E	3	4	5	5	5	5	5	5	2	1	
	F	2	3	4	4	5	5	4	4	3	1	
	G	2	4	4	4	5	5	4	4	3	1	
	H	2	4	5	5	5	6	5	5	4	1	
	I	3	4	4	5	5	5	4	4.5	2	1	
2	A	4	4	4	5	5	5	5	4.5	1	1	YES
	B	3	4	5	5	5	5	5	5	2	1	
	C	4	4	5	5	5	6	5	5	2	1	YES
3	A	4	4	5	5	6	6	5	5	2	1	YES
	B	4	4	5	5	5	6	5	5	2	1	YES
	C	2	3	4	4	5	6	4	4	4	1	
	D	3	4	4	5	5	6	5	4.5	3	1	
	E	4	4	5	5	5	5	5	5	1	1	YES
	F	3	4	5	5	5	5	5	5	2	1	
	G	3	4	4	5	5	6	5	4.5	3	1	
	H	2	4	4	4	5	5	4	4	3	1	

* Fractional values rounded to the nearest whole number

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Vita

Captain Bill Bower graduated from Anderson High School in Austin, Texas in June 1980. He entered the Air Force in 1983 and attended basis training. He spent the next 12 years working with Tactical Air Traffic Control Systems, deploying to various locations as a member of the 3rd Combat Communications Group and teaching tactical radar systems as an AETC instructor, where he attained the rank of Master Sergeant. Capt Bower has 2 Associate of Science Degrees from the Community College of the Air Force in Electronic Systems Technology and Instructor of Technology and Military Science. He received his Bachelor of Science Degree in Technical Management from the Oklahoma City University, graduating in 1994 with a 3.92 GPA. He has been certified by the Southern Association of Colleges as a Vocational Instructor and has attended several enlisted PME courses where he was the John Levitow Honor Graduate from the NCO Leadership School and Distinguished Graduate from the NCO Academy. He was accepted to Officer Training School in June, 1995 and graduated in September 1995 as the Honor Graduate. He received his Regular Commission in 1996.

While attending OTS, Lt Bower was selected as the OTS Student Wing Commander and graduated in September 1995 as the Honor Graduate. He was then assigned to the 16th Communications Squadron, Hurlburt Fld, Florida as the Visual Information Systems Flight Commander; after the SC/IM merger he became the Support Flight Commander. In March 1997 he volunteered to deploy to Prince Sultan Air Base,

Saudi Arabia, where he served as the Information Systems Flight Commander, 4404th Communications Squadron (Provisional). When he returned from Saudi Arabia, he became the 16th Communications Squadron Plans & Programs Flight Commander. In August 1999, he entered the Graduate School of Engineering and Management, Air Force Institute of Technology to pursue a MS in Information Resource Management. Upon graduation, he will be assigned to the Air Force Material Command Computer Systems Office, Technical Integration Division.

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14. ABSTRACT

Air Force resources are being committed to fund, implement, and support organizational knowledge management initiatives without any overarching Air Force Knowledge Vision or Knowledge Strategy to guide these efforts. The purpose of this research is to provide a framework model and framework implementation process that can be used to guide the identification, selection, and eventual implementation of Air Force knowledge management projects. An initial Literature Review was conducted and the findings were used to develop a framework model to guide the identification and selection of appropriate knowledge management initiatives that are consistent with organizational strategy and strategic objectives. Next, a Delphi study was conducted to evaluate the proposed framework and associated framework implementation methodology using four criteria: completeness, comprehensiveness, accuracy, and usefulness. The Delphi committee consisted of representatives from the Department of Defense, Army, Navy, Air Force, and National Defense University. The findings of the Delphi committee support the use of the proposed framework model as an appropriate method for guiding the identification and selection of knowledge management initiatives within the Air Force that are focused on supporting Air Force Strategy and Strategic Objectives.

15. SUBJECT TERMS

Knowledge Management, Delphi Technique, Air Force, Organizational Strategy, Strategic Objectives, Knowledge Management Framework, Framework, Project Management, Management

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